

## **CLASS 74, MACHINE ELEMENT OR MECHANISM**

### **SECTION I - CLASS DEFINITION**

Mechanical combinations, contrivances, or devices constituting portions of machines, instruments and apparatus and consisting of two or more fixed and movable parts so combined that the motion of one compels a completely controlled or constrained motion of the other according to a law of operation inherent in and depending on the nature of the combination, and also the elemental parts of such machines not provided for in other machine element classes.

### **SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

This class is intended as a generic class for mechanism and machine parts not otherwise classified. Other machine element classes subgeneric hereto are Class 384, Bearings; Class 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts.

This class does not include machines and instruments or apparatus claimed as such, for which see the appropriate art classes. It does not include the special tools, instruments, and subcombinations peculiar to the special arts and provided for in the classification of the art classes.

### **SECTION III - REFERENCES TO OTHER CLASSES**

#### **SEE OR SEARCH CLASS:**

- 70, Locks, appropriate subclasses and particularly subclasses 174+, for machine elements combined with locks wherein the element or its associated structure is modified solely to accommodate the lock, or where the device is modified for the reception of a locking device, whether or not claimed.
- 73, Measuring and Testing, subclasses 488+ for a speed responsive device, per se.
- 92, Expansible Chamber Devices, for the line between Class 74 and Class 92, see References to Other Classes of the class definition of Class 92 under SEARCH CLASS 74.
- 123, Internal-Combustion Engines, subclasses 90.1+ and 188.1+, for valve operating mechanism.
- 173, Tool Driving or Impacting, appropriate subclass for subject matter directed to driving or

impacting a tool, when such subject matter includes combined features peculiar to tool driving, but which does not include features limiting the subject matter to a specific tool art, such as specific shape of the work contacting portion of the tool, related tools, or an opposed work support. See References to Other Classes of the Class 173 class definition for a statement of the line with Class 74.

- 187, Elevator, Industrial Lift Truck, or Stationary Lift for Vehicle, appropriate subclasses.
- 188, Brakes, appropriate subclasses and especially subclasses 105 through 108 for brake operators.
- 192, Clutches and Power-Stop Control, appropriate subclasses and especially subclasses 82+, for clutch operators.
- 193, Conveyors, Chutes, Skids, Guides, and Ways, appropriate subclasses.
- 198, Conveyors: Power-Driven, appropriate subclasses.
- 242, Winding, Tensioning, or Guiding, appropriate subclasses.
- 251, Valves and Valve Actuation, subclasses 213+ for mechanical movement valve actuators.
- 267, Spring Devices, appropriate subclasses.
- 279, Chucks or Sockets, appropriate subclasses.
- 296, Land Vehicles: Bodies and Tops, various subclasses for bodies and tops having movable components which may be actuated by mechanical means.
- 384, Bearing, appropriate subclasses, and see (1) Note above.
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, see (1) Note supra.
- 474, Endless Belt Power Transmission Systems or Components, appropriate subclasses, and see particularly (5) Note under Lines With Other Classes in the class definition of Class 474.
- 475, Planetary Gear Transmission Systems or Components, for planetary gear transmissions.
- 476, Friction Gear Transmission Systems or Components, for friction gear transmissions.
- 477, Interrelated Power Delivery Controls, Including Engine Control, for interrelated control between an engine and a transmission.

#### **SUBCLASSES**

**1 MISCELLANEOUS:**

This subclass is indented under the class definition. Miscellaneous mechanisms and not provided for below.

**SEE OR SEARCH CLASS:**

343, Communications: Radio Wave Antennas, subclasses 754 and 757+ for directive antennas with scanning, sweeping or orienting of the beam, and including mechanisms for imparting spiral, rotary or rotary oscillatory motion to the antenna.

**1.5 ESCAPEMENTS:**

This subclass is indented under the class definition. Mechanisms comprising devices in which a unidirectionally biased power member, during at least a portion of its movement, imparts motion to an element which, as a result of such movement, alternately locks and releases the biased member for intermittent operation.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

526, for lever stops.  
565, for controller checks.

**SEE OR SEARCH CLASS:**

185, Motors: Spring, Weight, or Animal Powered, subclass 5, for composite weight motors which are escapement controlled and see the search notes thereunder for related search fields.

**2 AUTOMATIC OPERATION OR CONTROL (E.G., TRIPS):**

This subclass is indented under the class definition. Mechanisms for releasing or tripping portions of machines to cause other portions to automatically operate due to the expenditure of the potential energy possessed by such parts.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

584+, for automatically released yieldable pitmans and connecting rods.

**SEE OR SEARCH CLASS:**

40, Card, Picture, or Sign Exhibiting, subclass 521, for obstacle trip actuated changeable exhibitors.

56, Harvesters, subclasses 401+, for delivery trip shockers, and 432+, for tripped compressors and binders.  
76, Metal Tools and Implements, Making, subclass 15 for trip actuated file cutters, and subclasses 62 and 67 for trip actuated saw setters.  
89, Ordnance, subclasses 1.5+, for trip devices associated with bomb, flare, and signal dropping devices.  
111, Planting, subclasses 14+, for check wire tripped drillers.  
114, Ships, subclass 210, for anchor trips.  
124, Mechanical Guns and Projectors, subclasses 31+, for trigger mechanism.  
166, Wells, subclasses 237+ and the subclasses there noted for trip devices in wells.  
169, Fire Extinguishers, appropriate subclasses.  
188, Brakes, subclass 111, for trip operated vehicle brakes.  
200, Electricity: Circuit Makers and Breakers, appropriate subclasses.  
212, Traversing Hoists, subclass 116 for cable load suspension trips.  
246, Railway Switches and Signals, subclasses 76 and 201+, for track trips, 171+, for derailment contact trips and 359+, for train energy actuated trips.  
292, Closure Fasteners, subclasses 332+ for trip actuated closure fasteners.  
293, Vehicle Fenders, subclasses 33, 35 and 37, for trip actuated fenders.  
399, Electrophotography, subclasses 75+ for machine operations of an electrophotography device and subclasses 107+ for particular structure of the device, specifically subclasses 110+ for modular or displaceable components.

**3 Speed controlled:**

This subclass is indented under subclass 2. Mechanisms wherein the releasing or tripping is initiated by a speed responsive device.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclasses 535+ for a speed sensor of the centrifugal weight type.  
192, Clutches and Power-Stop Control, subclass 140 for speed responsive limit stops and subclass 147 for speed

response clutch releases combined with brakes.

**3.2 Valve gear trips (e.g., steam engine "Corliss" type):**

This subclass is indented under subclass 3. Mechanisms wherein a flow controlling valve is the released or tripped device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2, for other automatically-operated valve gear trips not speed responsive nor otherwise classifiable in subclasses below.

**3.5 Retarded:**

This subclass is indented under subclass 2. Mechanisms preset to cause the releasing or tripping at a particular time of day or at the termination of a particular time interval following the setting.

SEE OR SEARCH CLASS:

119, Animal Husbandry, subclasses 51.14+ for feeding devices including timer controlled trips.  
137, Fluid Handling, subclasses 624.19 and 624.22 for valves including timer controlled trips.  
185, Motors: Spring, Weight, or Animal Powered, subclasses 27+ for a retarded trip releasing a weight motor and subclasses 37+ for a retarded trip releasing a spring motor.  
200, Electricity: Circuit Makers and Breakers, subclasses 39+ for an electrical circuit switch controlled by a retarded latch trip.  
368, Horology: Time Measuring Systems or Devices, subclasses 243+ for an horological device controlling the tripping of a sounding device, and in the definition of subclass 152 see the "Note".

**3.52 Plural, sequential, trip actuations:**

This subclass is indented under subclass 3.5. Mechanism preset to cause sequential tripping of a single part or tripping of several parts in sequence.

**3.54 Clock train:**

This subclass is indented under subclass 3.5. Mechanism including a clock, a clock train or similar gearing.

**3.56 Winding knob trip (e.g., alarm mechanism):**

This subclass is indented under subclass 3.54. Mechanism wherein the trip includes the winding knob of a spring powered clock train or the winding knob of a spring powered operator (e.g., alarm mechanism) under the control of the clock train.

**4 Hit and miss:**

This subclass is indented under subclass 2. Mechanism wherein the releasing or tripping is intermittent and the mechanism is intended to insure a uniform speed output.

**5 GYROSCOPES:**

This subclass is indented under the class definition. Devices defined in (1) Note, below and known as gyroscopes.

(1) Note. A conventional gyroscope is a mechanism comprising a rotor journaled to spin about one axis, the journals of the rotor being mounted in an inner gimbal or ring, the inner gimbal being journaled for oscillation in an outer gimbal which in turn is journaled for oscillation relative to a support. The outer gimbal or ring is mounted so as to pivot about an axis in its own plane determined by the support. Hence the outer gimbal possesses one degree of rotational freedom and its axis possesses none. The inner gimbal is mounted in the outer gimbal so as to pivot about an axis in its own plane which axis is always normal to the pivotal axis of the outer gimbal. Hence the inner gimbal possesses two degrees of rotational freedom and its axis possesses one. The rotor is journaled to spin about an axis which is always normal to the axis of the inner gimbal. Hence the rotor possesses three degrees of rotational freedom and its axis possesses two. The center of gravity of the rotor is thus in a fixed position. The rotor simultaneously spins about one axis and is capable of oscillating about the two other axes, and thus except for its inherent resistance

due to rotor spin, it is free to turn in any direction about the fixed point.

Some gyroscopes have mechanical equivalents substituted for one or more of the elements, e.g., the spinning rotor may be suspended in a fluid, instead of being pivotally mounted in gimbals. In some special cases, the outer gimbal (or its equivalent) may be omitted so that the rotor has only two degrees of freedom. In other cases, the center of gravity of the rotor may be offset from the axis of oscillation, and thus the center of gravity of the rotor and the center of suspension of the rotor may not coincide.

- (2) Note. This is the generic locus for gyroscopes. Every rotating body has gyroscopic action, but such devices are not placed here unless at least one axis of oscillation is present.
- (3) Note. For combinations of gyroscopes with other devices see indented subclass 5.22 and the notes thereto appended.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5.22, and the notes thereto and see (2) Note supra.

SEE OR SEARCH CLASS:

248, Supports, subclass 182.1 for gimbals, per se.  
 310, Electrical Generator or Motor Structure, subclass 261 for rotors, per se.  
 446, Amusement Devices: Toys, subclasses 233+ for gyroscopic toys, including gyroscopic tops.

#### **5.1 With caging or parking means:**

This subclass is indented under subclass 5. Gyroscopes combined with mechanism to hold the rotor axis fixed, when the rotor is not spinning, or if spinning, when it is desired to take the gyroscope out of useful operation.

- (1) Note. The rotor axis may be positively held with respect to the gyroscope support, or it may be heavily weighed to hold the rotor axis fixed with respect to the earth.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5.44, where the force of gravitation, acting upon a weight, and reacting against the rotor axis erects an operative gyroscope.

#### **5.12 Rotor spin and cage release type:**

This subclass is indented under subclass 5.1. Devices having a mechanism to impart spin to a rotor and a further means to release the holding means after the rotor is up to speed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5.7, for rotor drives.

#### **5.14 And resetting means:**

This subclass is indented under subclass 5.1. Devices wherein further means is provided to adjust or vary the position held. This may be done by having the means which holds the rotor axis adjustable to vary the position held, or by having the first means restrain movement in one plane and a second means to position the rotor axis in that plane.

#### **5.2 With gimbal lock preventing means:**

This subclass is indented under subclass 5. Gyroscopes wherein means is provided to prevent alignment of the rotor axis with a gimbal axis.

#### **5.22 Combined:**

This subclass is indented under subclass 5. Gyroscopes combined with structure other than the gyroscope, except means to control and/or drive the mechanism.

- (1) Note. The large majority of patents found here are of the stabilizing type and recite the device stabilized by name only. Where structure of the device over and above that necessary to mount the device is claimed, or where a particular relationship to the device is claimed, the patents have been classified with the device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5.4+, for gyroscope control.  
 5.37, for drives for plural gyroscopes.  
 5.7, for drives for single gyroscopes.

- 64, for inertia or centrifugally controlled rotary transmitters.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses 504.2+, for a gyroscope combined with a speed responsive device.
- 105, Railway Rolling Stock, subclasses 141+, for monorail type railway rolling stock combined with gyroscopes and subclasses 150+, for suspended monorail type rolling stock combined with gyroscopes.
- 114, Ships, subclasses 21.1 and 24, for gyroscopically controlled torpedo steering mechanism; subclass 122, for gyroscopic anti-rolling stabilizers combined with ships; and subclass 144, for gyroscopic controlled steering.
- 244, Aeronautics and Astronautics, subclass 79, for gyroscope actuated automatic aircraft control.
- 396, Photography, subclass 13 for an aerial camera which is gyroscopically stabilized.
- 446, Amusement Devices: Toys, subclasses 233+ for gyroscopic toys, and subclass 462 for wheeled toys having inertia-operated driving means.
- 475, Planetary Gear Transmission Systems or Components, for gyroscopically controlled planetary gearing.

**5.34 Multiple gyroscopes:**

This subclass is indented under subclass 5. Gyroscopes comprising two or more gyroscopes.

**5.37 With rotor drives:**

This subclass is indented under subclass 5.34. Devices having means for driving the gyroscopes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 5.7, for drives for single gyroscopes.

**5.4 Gyroscope control:**

This subclass is indented under subclass 5. Gyroscopes having means to apply one or more forces to the rotor axis to control the movement of the rotor axis about its center of suspension.

**5.41 Erecting:**

This subclass is indented under subclass 5.4. Devices wherein one or more forces act to move the rotor axis to a given position, usually to a vertical position.

- (1) Note. Where the force of the surrounding atmosphere against a plurality of vanes is used for erection, the patent will be found in this subclass.

**5.42 By plural diverse forces:**

This subclass is indented under subclass 5.41. Devices where at least two diverse forces are used for erection.

- (1) Note. Pendulous gyroscopes having an additional means to erect them are here when both means are claimed, an cross-referenced to the subclasses indented hereunder for the separate means.

**5.43 By jet:**

This subclass is indented under subclass 5.41. Devices wherein the force of a fluid jet is used for erection.

**5.44 By weight:**

This subclass is indented under subclass 5.41. Devices wherein the gravitational force upon a weight is utilized for erection.

- (1) Note. Pendulous gyroscopes with no other erecting controls are here.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 5.1, for weight actuated parking or caging devices.
- 5.42, for pendulous gyroscopes having an additional force utilized for erection.

**5.45 By friction:**

This subclass is indented under subclass 5.41. Devices wherein the application of a frictional force is utilized for erection.

- (1) Note. Where the force of the surrounding atmosphere against a plurality of vanes is used for erection, the patents will be found in subclass 5.41.

- 5.46 By magnetic field:**  
This subclass is indented under subclass 5.41. Devices wherein the force of a magnetic field is utilized for erection.
- 5.47 By motor torque:**  
This subclass is indented under subclass 5.41. Devices where the torque of a prime mover constitutes the force used for erection.
- 5.5 Damping:**  
This subclass is indented under subclass 5.4. Devices having means to dampen the oscillation of the gimbals, or of the rotor axis.
- 5.6 With pick off:**  
This subclass is indented under subclass 5. Gyroscopes having a means to sense the relative position or change of position of the rotor axis, and/or its gimbals.
- (1) Note. The sensing means normally actuates or controls a signal, indicator or a control for another device.
- 5.7 With rotor drive:**  
This subclass is indented under subclass 5. Gyroscopes having means to drive the rotor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
5.12, for rotor spin mechanism combined with cage release mechanisms.
- 5.8 Vertical gyroscopes:**  
This subclass is indented under subclass 5. Gyroscopes peculiarly constructed for operating with the spin axis in a vertical position only.
- 5.9 Horizontal gyroscopes:**  
This subclass is indented under subclass 5. Gyroscopes peculiarly constructed for operating with the spin axis in a horizontal position only.
- 5.95 Flywheel structure:**  
This subclass is indented under subclass 5. Subject matter including a motion-smoothing component generally made up of a massive disk-like member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
572.2, for motion smoothing flywheel.
- 6 ENGINE STARTERS:**  
This subclass is indented under the class definition. Mechanical movements and/or gearing, combined as a unit, for initiating the starting of a machine, in which operative engagement with the machine to be started is initiated and controlled and power is applied to the gearing by some conventional means.
- (1) Note. See the Index, under “Starter” and “Starting”.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
139+, for intermittent unidirectional motion type engine starters.
- SEE OR SEARCH CLASS:  
123, Internal-Combustion Engines, subclasses 179.1+ for other starting devices for internal combustion engines.  
185, Motors: Spring, Weight, or Animal Powered, subclasses 6+, 10+, 32, and 39, for structure for winding motors of the weight and spring types.  
290, Prime-Mover Dynamo Plants, subclasses 10, 22-38, 46-68, for dynamo-electric starter-generator structure.
- 7 Automatic:**  
This subclass is indented under subclass 6. Starters in which the operative engagement with the machine to be started is automatic.
- 8 Radial meshing:**  
This subclass is indented under subclass 6. Starters in which meshing of the gears with the machine to be started takes place in a radial direction.
- 9 Cam operated:**  
This subclass is indented under subclass 6. Starters in which meshing of the gearing with the machine to be started is accomplished by a cam device other than a screw.

**10 SHAFT OPERATORS (RADIO TUNER TYPE):**

This subclass is indented under the class definition. Assemblies particularly adapted for mechanically rotating one or more shafts of electronic tuning devices into desired angular positions.

- (1) Note. The art is directed to the positioning of radio tuning shafts having indicating means and/or variable condensers associated therewith for adjustment.
- (2) Note. Electrically actuated dial operators are not here, even though claimed in combination with mechanical operators for these subclasses. They will be found in Class 192, Clutches and Power-Stop Control, subclasses 138+, and in Class 318, Electricity: Motive Power Systems, appropriate subclasses (including particularly subclasses 560+, which has the follow-up type motor controls). The line between these two classes is stated in the class definition of Class 318, Lines With Other Classes, Load Device Driven by the Motor (Including Power, Motion, Force, or Torque Transmitting Devices, Motor Systems and Power, Motion, Force, or Torque Transmitting Devices, and under the reference to Class 192 under "SEARCH CLASSES" at the end of the class (318) definition.
- (3) Note. These subclasses will take the recitation of a condenser, inductance, transformer or a radio tuner by name only when claimed in combination with shaft positioning means. Whenever significant structure of the condenser, inductance, transformer, or tuner are recited, the devices will be classified in Class 455, Telecommunications, particularly sub 150.1+ where radio tuner structure is recited. Class 334, Tuners, appropriate subclasses for radio tuner structure, per se, or Class 336, Inductor Devices, appropriate subclasses where variable transformer or inductance structure is recited. Where the operator is merely a screw gearing and the tuner is recited by name only, the search should be contin-

ued in this class (74), subclass 424.71-424.96.

- (4) Note. These subclasses will take the shaft positioning means with respect to its support in combination with indicating means to indicate the position, adjustment or movement of the shaft. And see the Search Note to the Signals and Indicators class, below.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 20, through 110 inclusive, for nonintermittent type mechanical movements.
- 111+, for intermittent grip type mechanical movements.
- 424.71 through 424.96, for screw gearing, and see (3) Note supra.
- 469+, for control lever and linkage systems.
- 526, for stops for levers.
- 553, for knob or dial operators.
- 640, for gearing.
- 813+, for assemblies of general utility, including turret mechanisms for metal working machines having means to index rotary members, and see the Notes thereto.

**SEE OR SEARCH CLASS:**

- 116, Signals and Indicators, 200+, provides for indicators attached to, or associated with some movable device to indicate the movement, adjustment or position of such device. Indented subclasses 241+, provides for radio tuner position indicators. Class 116 will take shaft positioning means with respect to its support (even though in the form of a mechanical movement) in combination with the indicating means when only the part of the shaft positioning means with respect to its support necessary to operate the indicator is claimed, i.e., where no structure for positioning the shaft is recited which does not operate the position indicator.
- 192, Clutches and Power-Stop Control, subclasses 138+, for power-stop limit controls and see (2) Note, supra.

- 235, Registers, appropriate subclasses for related operating devices for registers and particularly subclasses 12+, for those which are key board operated.
- 318, Electricity: Motive Power Systems, appropriate subclasses for controlled electric motor operators, particularly subclasses 560+, for servo controlled operators and see (2) Note, supra.
- 336, Inductor Devices, appropriate subclasses for variable transformer or inductance structure combined with shaft positioning means, and see (3) Note, above.
- 361, Electricity: Electrical Systems and Devices, subclasses 271+ for specific variable condenser structure.
- 403, Joints and Connections, subclasses 230+ for joints between the end of a shaft and a plate-like member.
- 455, Telecommunications, subclasses 150.1+ for radio receivers with tuners, see (3) Note.

#### 10.1 **Preselected position:**

This subclass is indented under subclass 10. Devices having interengaging means by which the rotation of the shaft may be halted at a plurality of predetermined angular positions.

#### 10.15 **Step by step:**

This subclass is indented under subclass 10.1. Devices having means interposed between a single initiator and the shaft for rotating the shaft through a series of successive predetermined positions, the rotation of the shaft being halted at each such successive position.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 126+, for mechanical movements for changing reciprocating motion to intermittent unidirectional motion, and particularly subclass 142 for lever actuators.

#### 10.2 **Rotatable stop and projectable abutment:**

This subclass is indented under subclass 10.1. Devices having a rotatable stop element for halting shaft movement and a movable abutment for the stop element, and means for moving the abutment into a position in which the stop element may contact the abutment.

- (1) Note. Electric motor control of the rotatable stop elements and/or the movable abutments will be found in Class 192, Clutches and Power-Stop Control, subclasses 138+, and particularly subclass 142; and the appropriate subclass of Class 318, Electricity: Motive Power Systems, subclasses 560+, for position servo control systems particularly subclass 614, friction braking at balance; see (2) Note to this class (74), subclass 10.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 138+, for power-stop limit controls and see (1) Note.
- 318, Electricity: Motive Power Systems, appropriate subclasses for electric motor control, and particularly subclasses 560+, for position servo control type particularly subclass 614, for friction braking at balance; and see (1) Note.

#### 10.22 **Digital dial type:**

This subclass is indented under subclass 10.1. Devices in which the shaft operator is a dial and is provided with a series of single finger-receiving openings.

SEE OR SEARCH CLASS:

- 200, Electricity: Circuit Makers and Breakers, subclass 11, for dial operated switches.
- 379, Telephonic Communications, subclass 363 for a telephone dial mechanism.

#### 10.27 **Plural operator:**

This subclass is indented under subclass 10.1. Devices having more than one operator for controlling the shaft.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 10.54, for separate operators for each of a plurality of speed drives of the nonselective type dial operators.
- 479, for plural input single output lever and linkage systems.
- 625+, for alternate manual and power operators.
- 665+, for plural input single output gearing.



- SEE OR SEARCH CLASS:  
 235, Registers, appropriate subclasses for related operating devices for registers and particularly subclasses 12+, for those which are keyboard operated.  
 475, Planetary Gear Transmission Systems or Components, subclasses 1+ for plural power sources for driving planetary gearing.
- 10.29 Cam and follower:**  
 This subclass is indented under subclass 10.27. Devices wherein a cam and follower is interposed between the operator and the shaft.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 10.6, for nonselective cam and follower type dial operators.  
 567+, for cam and/or follower structure, per se.
- 10.31 Adjustable cam:**  
 This subclass is indented under subclass 10.29. Devices wherein the cam is adjustable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 568, for adjustable cams, per se.
- 10.33 Sliding operator:**  
 This subclass is indented under subclass 10.31. Devices where the cam is carried by a sliding operator.
- 10.35 Adjustable follower:**  
 This subclass is indented under subclass 10.29. Devices wherein the follower is adjustable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 569, for followers, per se.
- 10.37 Sliding operator:**  
 This subclass is indented under subclass 10.35. Devices where the cam is carried by a sliding operator.
- 10.39 Rack and pinion:**  
 This subclass is indented under subclass 10.27. Devices wherein a rack and pinion gearing is interposed between at least one of the operators and the shaft.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 422, for rack and pinion gearing, per se.
- 10.41 With detent or clicker:**  
 This subclass is indented under subclass 10.1. Devices in which a detent or click device tends to hold the shaft in the predetermined positions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 527+, for detents, per se.
- 10.45 Plural shafts:**  
 This subclass is indented under subclass 10. Devices in which a plurality of shafts are rotated by a single operator.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 471+, for single input plural output lever and linkage systems.  
 665+, for single input plural output gearing.
- SEE OR SEARCH CLASS:  
 475, Planetary Gear Transmission Systems or Components, for plural outputs from planetary gearing.
- 10.5 Plural speed:**  
 This subclass is indented under subclass 10. Devices in which the shaft may be rotated at a plurality of speeds.
- (1) Note. In most cases, a fast speed is used for coarse rotational adjustment and a slow speed for fine adjustment.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 325+, for interchangeably locked nonplanetary gearing.
- 10.52 Planetary:**  
 This subclass is indented under subclass 10.5. Devices wherein a planetary gearing is interposed between the operator and the shaft.
- SEE OR SEARCH CLASS:  
 475, Planetary Gear Transmission Systems or Components, for planetary gearing, per se.

**10.54 Separate operators:**

This subclass is indented under subclass 10.5. Devices having separate operators for each speed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

10.52, for separate operators for planetary gearing.

665+, for plural input single output nonplanetary type gearing.

**10.6 Cam and follower:**

This subclass is indented under subclass 10. Devices wherein a cam and follower is interposed between the operator and the shaft.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

10.29+, for selective type cam and follower dial operators.

567+, for cam and/or follower structure, per se.

**10.7 Tensioned flexible operator:**

This subclass is indented under subclass 10. Devices wherein the operator includes a flexible strand operating in tension only, usually in the nature of a belt and pulley drive, although the strand may be anchored to one of the pulleys.

SEE OR SEARCH CLASS:

474, Endless Belt Power Transmission Systems or Components, appropriate subclasses for a belt and pulley drive in a power transmission.

**10.8 Gear drive:**

This subclass is indented under subclass 10. Devices wherein gearing is interposed between the operator and the shaft.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

640+, for gearing, per se.

**10.85 Worm or screw:**

This subclass is indented under subclass 10.8. Devices where the gearing is of the worm or screw type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

424.71 through 424.96, for screw type gearing, per se.

425, for worm type gearing, per se.

**10.9 Lever and linkage drive:**

This subclass is indented under subclass 10. Devices wherein a lever and linkage system is interposed between the operator and the shaft.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

469+, for lever and linkage systems, per se.

**11 POWER TAKE-OFF:**

This subclass is indented under the class definition. Devices comprising a subordinate power transmitting assembly, additional to and driven by one of the elements of a main power line, or by the prime mover therefor.

- (1) Note. Power take offs from a prime mover for this class (74) are here unless they are made from a shaft extension of a prime mover, in which case, see this class, subclass 15.63. Take offs for engine accessory drives will be found in Class 123, Internal-Combustion Engines, subclass 198; take offs involving vehicle structure are found in Class 180, Motor Vehicles, subclasses 53.1+; and take offs for vehicle driven pumps are in Class 417, Pumps, subclasses 231+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

15.63, and see (1) Note, supra.

16, plural driven devices actuated from a power table or stand.

640+, for gearing, per se.

665+, for plural driven devices of general application.

SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclass 198, for take offs for engine accessories (and see (1) Note, supra).

172, Earth Working, subclasses 35+ for an earth working implement comprising an earth working tool driven by a power take-off, and subclasses 492+

- and the subclasses there noted for an earth working implement adjusted by a power take-off.
- 180, Motor Vehicles, subclasses 53.1+, for power take offs involving vehicle structure (and see (1) Note, supra).
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 124+, for drilling machines in which the feeding movement between tool and work is effected by means actuated by the rotation of the tool spindle.
- 475, Planetary Gear Transmission Systems or Components, for gearing driving plural load devices.
- 12 Speedometer:**  
This subclass is indented under subclass 11. Assemblies, in which the auxiliary driven element is a speedometer.
- 13 Wheel take-off:**  
This subclass is indented under subclass 11. Mechanisms, in which the power is taken directly from or transmitted directly to, the wheels of a vehicle.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclasses 166.3+ and 388+, for portable power saws.
- 180, Motor Vehicles, subclasses 53.1+, for power take-offs combined with vehicle structure.
- 185, Motors: Spring, Weight, or Animal Powered, subclasses 15+, for animal powered motors.
- 14 Wheel bed type:**  
This subclass is indented under subclass 13. Mechanisms, in which the mechanisms are provided with power transmitting or receiving elements which contact with and support at least one wheel of the vehicle.
- 15 Supported pulley:**  
This subclass is indented under subclass 13. Mechanisms, in which power is delivered from or to a vehicle wheel through a device attached thereto, the wheel being out of peripheral contact with any other object.
- SEE OR SEARCH CLASS:  
474, Endless Belt Power Transmission Systems or Components, appropriate subclasses for pulley structure and for pulleys used in endless belt power transmissions.
- 15.2 Plural take-off shafts:**  
This subclass is indented under subclass 11. Devices having a plurality of power take-off shafts.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
16, for plural driven devices actuated from a power table or stand.
- 665+, for plural driven devices of general application.
- SEE OR SEARCH CLASS:  
192, Clutches and Power-Stop Control, subclasses 48.1+ for plural clutch-assemblages, and especially subclasses 48.8+ for such assemblages associated with three or more shafts, one of which may be a power take-off shaft.
- 15.4 With independent change speed gearing:**  
This subclass is indented under subclass 11. Devices in which independent gearing means are provided to effect a change in output speed of, and/or a forward or reverse drive for, the take-off.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
325+, for nonplanetary change speed gearing.
- SEE OR SEARCH CLASS:  
475, Planetary Gear Transmission Systems or Components, for planetary change speed gearing.
- 15.6 From shaft extension:**  
This subclass is indented under subclass 11. Devices in which either a prime mover shaft, a main power line shaft, or an auxiliary driven shaft is extended to constitute a power take-off.
- (1) Note. The so-called "power take-off shaft" to be found on some type of trac-

tors is considered to be an auxiliary driven shaft.

SEE OR SEARCH CLASS:

- 403, Joints and Connections, appropriate subclasses for shaft couplings of a nonflexible type.
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses for a flexible coupling between a torque transmitting shaft and a driven member.

**15.63 Prime mover shaft, e.g., crank shaft:**

This subclass is indented under subclass 15.6. Devices in which a shaft in a prime mover for the power line (e.g., a crank shaft or a cam shaft) is extended to constitute a take-off.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 11, for other take-offs from prime movers, and see (1) Note to that definition for the line between these two subclasses.

SEE OR SEARCH CLASS:

- 123, Internal-Combustion Engines, subclasses 185.1+, for engine crankshaft extensions employed for engine starting and subclass 198 for engine accessories driven by a shaft extension.
- 417, Pumps, subclasses 231+, for vehicle engine driven power take-offs for pumps.

**15.66 Change speed transmission shaft:**

This subclass is indented under subclass 15.6. Devices in which a shaft in a change speed transmission is extended to constitute the take-off.

**15.69 Vehicle propeller shaft:**

This subclass is indented under subclass 15.6. Devices in which the propeller shaft of a vehicle is extended to constitute a take-off.

- (1) Note. The power take-off is normally at the differential.

**15.8 Intermediate ends of power transmitting line:**

This subclass is indented under subclass 11. Devices which are driven by a connection in the main power transmitting line and intermediate its driving and driven ends.

- (1) Note. A power transmitting line is a power path comprising, e.g., one or more clutches and/or gearing and/or brakes, having a prime mover at one end and a load at the other.

**15.82 Vehicle propulsion transmitting line:**

This subclass is indented under subclass 15.8. Devices in which the power transmitting line is used for vehicle propulsion.

**15.84 Between prime mover shaft and transmission:**

This subclass is indented under subclass 15.82. Devices in which the connection to the transmitting line is located between the prime mover output shaft and the transmission.

**15.86 Drive from transmission gear:**

This subclass is indented under subclass 15.82. Devices in which the driving connection comprises a gear in mesh with a second gear, which second gear is part of the transmission gearing.

**15.88 Between transmission and propeller shaft:**

This subclass is indented under subclass 15.82. Devices in which the driving connection to the transmitting line is located between the driven shaft of the transmission and the propeller shaft.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 48.1+ for plural clutch-assemblages, and especially subclasses 48.8+ for such assemblages associated with three or more shafts, one of which may be a power take-off shaft.

**16 POWER TABLES AND STANDS:**

This subclass is indented under the class definition. Portable assemblies designed to drive one or more auxiliary attachments.

- (2) Note. For stands, per se, see the search notes below.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclasses 49.1+ for a machine having a brush as its sole type of cleaning instrument, and that is especially adapted for cleaning a floor, wall, or ceiling.
- 108, Horizontally Supported Planar Surfaces, subclasses 20+ for a power driven horizontally supported surface of general utility.
- 248, Supports, subclasses 637+ for machinery supports.
- 310, Electrical Generator or Motor Structure, subclasses 47 and 50 for portable or hand held electric motors.
- 312, Supports: Cabinet Structure, subclasses 21+, for stands per se.
- 366, Agitating, appropriate subclasses, particularly subclasses 197+ and 208+.
- 433, Dentistry, subclasses 103+ for dental engines.

**17 WASHER AND WRINGER:**

This subclass is indented under the class definition. Assemblies particularly adapted for the operation of a washing and wringing machine.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 378+, for interchangeably locked, single clutch shaft, single forward and reverse gearing.
- 385+, for interchangeably locked, pivotally supported bevel gearing.

SEE OR SEARCH CLASS:

- 68, Textiles: Fluid Treating Apparatus, subclasses 21+, for textile fluid treating apparatus combined with fluid extraction of the squeezing type.

**17.5 FULL STROKE MECHANISM:**

This subclass is indented under the class definition. Devices for compelling a reciprocating part to be actuated to its full extent before it can be returned.

SEE OR SEARCH CLASS:

- 81, Tools, subclass 313 for pliers and plural-handle wrenches with jaw-movement completion means.

**17.8 MOTION TRANSFER THROUGH IMPERFORATE FLEXIBLE SEAL:**

This subclass is indented under the class definition. Devices having an imperforate member functioning as a seal for an aperture in a partition or for a passageway, the member being flexible at least in part to permit movement with respect to the partition and being fixed to the partition or walls of the passageway, there being means contacting one side of the seal member to receive or transfer motion from or to the member, and there being relative motion between the seal member and the means at the point of contact.

- (1) Note. The seal member may include bearing surfaces or the like to minimize the effect of the relative motion on the seal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 18+, for flexible seals pierced by a rod, which seal is fixed to its support and to the rod.

SEE OR SEARCH CLASS:

- 313, Electric Lamp and Discharge Devices, subclass 148 for electric lamp and discharge devices provided with means to transmit motion to an electrode through a movable envelope wall portion.

**18 FLEXIBLE SEALING DIAPHRAGM ATTACHED TO MOVING ROD AND TO CASING:**

This subclass is indented under the class definition. Devices in which motion is transmitted through a sealed casing by means of a flexible sealing material attached to the casing and to a moving rod which passes through the sealing material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 566, for slot closers for levers.

## SEE OR SEARCH CLASS:

- 92,     Expansible Chamber Devices, sub-classes 34+ for a bellows type expansible chamber device and subclasses 96+ for a diaphragm type expansible chamber device.
- 180,    Motor Vehicles, subclass 90.6     for guards for pedals and gear shift levers.
- 277,    Seal for a Joint or Juncture, for     a generic sealing means or process, subclasses 634+ for a static contact seal for other than an internal combustion engine, or a pipe, conduit, or cable that is a flexible sleeve, boot, or diaphragm.
- 313,    Electric Lamp and Discharge Devices, subclasses 146+, for electronic tubes and electric lamps having a sealed envelope and provided with means for transmitting force from the outside of the envelope to the interior of the envelope for the purpose of moving an electrode within the envelope.
- 403,    Joints and Connections,     appropriate subclasses for a mere connection comprising a flexible diaphragm or bellows joining a plate or wall and a rod passing through an aperture therein.
- 464,    Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 52+ for a flexible shaft combined with a housing; and subclasses 170+ for a housing for a rotary shaft.

**18.1    Pivoting or nutating rod:**

This subclass is indented under subclass 18. Devices in which the rod pivots or nutates.

**18.2    Longitudinally reciprocating rod:**

This subclass is indented under subclass 18. Devices in which the rod reciprocates longitudinally. Mechanical Movements. Devices under the class definition other than gearing for imparting motion to one body from the motion of another body, wherein the two motions, or some intermediate motion, are of different form, type or degree.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 469+,   for control lever and linkage systems.
- 640+,   for gearing.
- 828+,   for mechanical movement having “on the fly” adjustment of the driven member.

## SEE OR SEARCH CLASS:

- 226,    Advancing Material of Indeterminate Length, appropriate subclasses for methods of, and apparatus for, feeding material without utilizing the leading or trailing ends to effect movement of the material.

**20    Oscillating to reciprocating and alternating rotary:**

Mechanical Movements for converting oscillating motion to the compound motion of reciprocation and alternating rotary motion.

**21    Oscillating to reciprocating and intermittent rotary:**

Mechanical Movements for converting oscillating motion to the compound motion of reciprocation and intermittent rotary motion.

**22    Rotary to reciprocating and rotary:**

Mechanical Movements for converting rotary motion to the combined motion of reciprocation and rotary motion.

## SEE OR SEARCH CLASS:

- 241,    Solid Material Comminution or Disintegration, subclass 205, for apparatus using this mechanical movement.
- 242,    Winding, Tensioning, or Guiding, subclasses 241 and 242 for drive mechanisms in fishing reels that convert rotary input into both reciprocation and rotation of an output.
- 414,    Material or Article Handling, subclasses 431+ for apparatus for advancing and rotating an elongated article not intended to remain associated with the apparatus (e.g., a tube to be worked on) by means adapted to engage the article between its ends.

**23 Rotary to reciprocating and alternating rotary:**

Mechanical Movements for converting rotary motion to the compound motion of reciprocation and alternating rotary motion.

**24 Rotary to reciprocating and intermittent rotary:**

Mechanical Movements for converting rotary motion to the compound motion of reciprocation and intermittent rotary motion.

**25 Rotary to or from reciprocating or oscillating:**

Mechanical Movements for converting rotary motion to or from reciprocating or oscillating motion.

## SEE OR SEARCH CLASS:

- 30, Cutlery, subclasses 215+, for rotary power driven multiple shearing position shears.
- 241, Solid Material Comminution or Disintegration, subclasses 262+, for apparatus using this mechanical movement.
- 242, Winding, Tensioning, or Guiding, subclasses 241+, 271+, 447.1+, and 476.7+ for drive mechanisms that convert a rotary input motion into reciprocation or oscillation of a line guide.
- 433, Dentistry, subclasses 118+ for reciprocating or oscillating dental instruments receiving rotary power.

**26 Head motions:**

This subclass is indented under subclass 25. Mechanisms, especially adapted for shaking screens in which the screen is not claimed as a positive element and excepting those driven by unbalanced weights.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 61, for screens driven by unbalanced weights.

## SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 750.1+, for reciprocating conveyors using this mechanical movement.

- 209, Classifying, Separating, and Assorting Solids, for driving mechanisms in combination with the screen.

**27 Reciprocating carriage motions:**

This subclass is indented under subclass 25. Mechanisms for converting rotary motion to or from reciprocating or oscillating motion of a carriage in which the driven member is driven by different types of mechanism during different parts of its stroke.

## SEE OR SEARCH CLASS:

- 101, Printing, subclasses 292+, for web type presses and subclasses 316+, for other type presses having reciprocating beds for bed and platen machines.

**28 Phonograph type:**

This subclass is indented under subclass 27. Mechanisms, especially adapted for moving the tone arm of a phonograph across the record.

## SEE OR SEARCH CLASS:

- 369, Dynamic Information Storage or Retrieval, subclasses 215.1 through 230 for such subject matter combined with tone arm structure.
- 720, Dynamic Optical Information Storage or Retrieval, subclasses 659 through 670 for power driven transducer assembly in a dynamic optical information storage or retrieval device.

**29 Rack and pinion type:**

This subclass is indented under subclass 25. Mechanisms, in which the mechanism involved is a rack and pinion and cannot be classified in any of the subclasses under this subclass.

**30 Shifting rack:**

This subclass is indented under subclass 29. Mechanisms, in which the rack moves in and out of engagement with the pinion.

**31 Shiftable pinion:**

This subclass is indented under subclass 29. Mechanisms, in which the pinion moves in and out of engagement with the rack.

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| <p><b>32 Segmental pinion:</b><br/>This subclass is indented under subclass 29. Mechanisms, in which the teeth on the pinion cover less than 360 degrees of the circumference of the pinion.</p> <p><b>33 Alternately rotated pinion:</b><br/>This subclass is indented under subclass 29. Mechanisms, in which the pinion is always in mesh with the rack but its direction of rotation is alternated.</p> <p><b>34 Clutchable gears:</b><br/>This subclass is indented under subclass 29. Mechanisms, in which the pinion or pinions are constantly in mesh with the rack but are clutched and declutched to the shaft by which they are carried.</p> <p><b>35 Bevel:</b><br/>This subclass is indented under subclass 34. Mechanisms, in which the pinion or pinions are constantly in mesh with the rack but are clutched and declutched to the shaft by which they are carried, the pinions being of the bevel type.</p> <p><b>36 Overcoming dead center:</b><br/>This subclass is indented under subclass 25. Mechanisms, in which the mechanisms involved either prevents the device from stopping on dead center or has some auxiliary mechanism for throwing the device off of dead center.</p> <p><b>37 Belt or chain carried member:</b><br/>This subclass is indented under subclass 25. Mechanisms, which change the motion by means of a chain or belt.</p> <p><b>38 Crank, lever, toggle, and slide:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, lever, toggle, and slide.</p> <p><b>39 Crank, lazy-tong, and slide:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, lazy-tong, and slide.</p> | <p><b>40 Crank, pitman, lever, and slide:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, pitman, lever, and slide.</p> <p>SEE OR SEARCH CLASS:<br/>123, Internal-Combustion Engines, subclass 78, for variable clearance, four cycle engines.</p> <p><b>41 Pump jack type:</b><br/>This subclass is indented under subclass 40. Mechanisms, including a crank, pitman, lever and slide of the pump jack type.</p> <p><b>42 Crank, pitman, and lever:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, pitman, and lever.</p> <p>SEE OR SEARCH CLASS:<br/>30, Cutlery, subclass 217, for multiple shearing position shears using this mechanical movement.</p> <p><b>43 Multiple levers:</b><br/>This subclass is indented under subclass 42. Mechanisms, including a crank, pitman, and a plurality of levers.</p> <p><b>44 Crank, pitman, and slide:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, pitman, and slide.</p> <p><b>45 Crank, lever, and slide:</b><br/>This subclass is indented under subclass 25. Mechanisms, including a crank, lever, and slide.</p> <p>SEE OR SEARCH CLASS:<br/>30, Cutlery, subclass 218, for multiple shearing position shears using this mechanical movement.</p> <p><b>46 Rack connections:</b><br/>This subclass is indented under subclass 45. Mechanisms, including a crank, lever, and slide and the connection between part of the members including a rack.</p> |
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- 47 Crank and lever:**  
This subclass is indented under subclass 25. Mechanisms, including a crank and lever.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclass 219, for multiple shearing position shears using this mechanical movement.
- 48 Slidable connections:**  
This subclass is indented under subclass 47. Mechanisms, including a crank and lever with a slidable connection between the crank and lever.
- 49 Crank and slide:**  
This subclass is indented under subclass 25. Mechanisms, including a crank and slide.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclass 220, for multiple shearing position shears using this mechanical movement.
- 50 Slidable connections (e.g., scotch yoke):**  
This subclass is indented under subclass 49. Mechanisms, including a crank and slide with a slidable connection between the crank and slide.
- 51 Crank and multiple pitmans:**  
This subclass is indented under subclass 25. Mechanisms, including a crank and more than one pitman.
- 52 Planetary gearing and slide:**  
This subclass is indented under subclass 25. Mechanisms, including planetary gearing and a slide.
- 53 Cam, lever, and slide:**  
This subclass is indented under subclass 25. Mechanisms, including a cam, lever, and slide.
- 54 Cam and lever:**  
This subclass is indented under subclass 25. Mechanisms, including a cam and lever.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclass 219, for multiple shearing position shears using this mechanical movement.
- 55 Cam and slide:**  
This subclass is indented under subclass 25. Mechanisms, including a cam and slide.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
838, for a cam and slide adjusting a stroke "on the fly".
- SEE OR SEARCH CLASS:  
30, Cutlery, subclass 220, for multiple shearing position shears using this mechanical movement.
- 56 Axial cam:**  
This subclass is indented under subclass 55. Mechanisms, including a cam and slide, the cam being of the axial type.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
839, for axial type cams adjusting a stroke "on the fly".
- 57 Grooved:**  
This subclass is indented under subclass 56. Mechanisms, including a cam and slide, the cam being of the axial type and the cam surface being in the form of a groove in the cam surface.
- 58 Multiple screw:**  
This subclass is indented under subclass 57. Mechanisms, including two axially grooved cams or screws rotating in opposite directions, one of which drives or is driven by the reciprocated or oscillated member or slide in one direction and the other in the opposite direction.
- 59 Alternately rotated screw:**  
This subclass is indented under subclass 57. Mechanisms, including an axially grooved cam connected to a slide, the cam being alternately rotated as the slide alternately changes its direction.
- 60 Wabblers type:**  
This subclass is indented under subclass 55. Mechanisms, including an axial cam and slide, the cam being of the wabblers type.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
123, for intermittent wabbler gearing.
- SEE OR SEARCH CLASS:  
91, Motors: Expansible Chamber Type, subclasses 499+ for expansible chamber motors utilizing wabbler type, axial cams and slides.  
123, Internal-Combustion Engines, subclasses 56.2+ for an internal-combustion engine which utilizes a rotary output shaft, parallel to the engine cylinders which is driven by a cam on the rotary output shaft.  
475, Planetary Gear Transmission Systems or Components, subclasses 163+ for planetary wabbler gearing.
- 61 Unbalanced weights:**  
This subclass is indented under subclass 25. Mechanisms, in which the mechanism involved makes use of unbalanced weights to produce the reciprocating or oscillating motion.
- SEE OR SEARCH CLASS:  
209, Classifying, Separating, and Assorting Solids, subclass 367, for apparatus utilizing this mechanical movement.
- 62 Trammel-pitman:**  
This subclass is indented under subclass 25. Mechanisms, in which the mechanism involved includes a cam having a plurality of intersecting slots, in which slide projections on a beam or connecting rod.
- SEE OR SEARCH CLASS:  
33, Geometrical Instruments, subclasses 30.1+, for ellipsographs.
- 63 Rotary to rotary:**  
Mechanical movements for changing rotary motion to rotary motion.
- 64 Inertia or centrifugal transmitters:**  
This subclass is indented under subclass 63. Mechanisms, in which the motion is changed by means of inertia or centrifugal means.
- SEE OR SEARCH CLASS:  
173, Tool Driving or Impacting, subclasses 93.5+ for a tool impacting device which comprises a connection adapted to rotate a tool in low torque condition and yield in overload to deliver torsional impact.
- 65 Crank, pitman, lever, and crank:**  
This subclass is indented under subclass 63. Mechanisms in which the motion is changed by means of a crank, pitman, lever, and crank.
- 66 Crank, lever, and crank:**  
This subclass is indented under subclass 63. Mechanisms, in which the motion is changed by means of a crank, lever, and crank.
- 67 Crank, pitman, and crank:**  
This subclass is indented under subclass 63. Mechanisms, in which the motion is changed by means of a crank, pitman, and crank.
- 68 Cranks, link connected:**  
This subclass is indented under subclass 63. Mechanisms, in which the motion is changed by means of cranks which are connected together by links.
- 69 Cranks, slidable connections:**  
This subclass is indented under subclass 63. Mechanisms, in which the motion is changed by cranks which are slidably connected together.
- 70 Rotary to alternating rotary:**  
Mechanical Movements for converting rotary motion to alternating rotary motion.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
318, through 324, for alternating rotary gearing.
- 71 Mangle connections:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by means of a mangle and gearing and the driving member is the shiftable member.
- (1) Note. By mangle is meant a rack, wheel, or any other movable member having teeth on opposite sides, engaged by a

pinion which meshes with the opposite sides alternately, to convert the continuous rotary motion of the pinion to an oscillating or reciprocating motion of the mangle rack, or wheel.

SEE OR SEARCH THIS CLASS, SUBCLASS:

318, through 324, for converting rotary to alternating rotary motion by gearing not of the mangle type.

SEE OR SEARCH CLASS:

68, Textiles: Fluid Treating Apparatus, appropriate subclasses, for apparatus using this mechanical movement.

**72 Shiftable driven gear:**  
This subclass is indented under subclass 71. Mechanisms, in which the motion is changed by means of a mangle and gearing and the driven member is the shiftable member.

**73 Central teeth:**  
This subclass is indented under subclass 72. Mechanisms, the driven gear being shiftable and the teeth on the mangle being located along the center line of the mangle.

**74 Multilated gearing connections:**  
This subclass is indented under subclass 71. Mechanisms, in which the motion is changed by means of a mangle and gearing and the gearing is mutilated.

**75 Crank, pitman, and lever:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by means of a crank, pitman, and lever.

**76 Reciprocating rack connections:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by means of a reciprocating rack.

**77 Crank and pitman actuator:**  
This subclass is indented under subclass 76. Mechanisms, in which the motion is changed by means of a reciprocating rack driven by a crank and pitman.

**78 Simple crank actuator:**  
This subclass is indented under subclass 76. Mechanisms, in which the motion is changed by means of a reciprocating rack driven directly by the crank.

**79 Oscillating rack connections:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by means of an oscillating rack.

**80 Mangle actuated:**  
This subclass is indented under subclass 79. Mechanisms, in which the rack is mangle actuated.

**81 Crank and pitman actuator:**  
This subclass is indented under subclass 79. Mechanisms, in which the rack is driven by a crank and pitman.

**82 Flexible connector type:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by means of a flexible member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

95, for other mechanical movements using flexible connectors.

**83 Associated inertia devices:**  
This subclass is indented under subclass 70. Mechanisms, in which the motion is changed by inertia devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

92+, for other mechanical movements utilizing inertia devices.

**84 Rotary to intermittent unidirectional motion:**  
Mechanical Movements for changing rotary motion to intermittent unidirectional motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

111+, for mechanical movements of the intermittent grip type which change rotary motion to intermittent unidirectional motion.

415, for pin tooth gearing.

436, for Geneva gears.

- 86 Rotary to gyratory:**  
Mechanical Movements for converting rotary motion to gyratory motion.

SEE OR SEARCH CLASS:

241, Solid Material Comminution or Disintegration, subclasses 207+, for comminutors utilizing this mechanical movement.

- 87 Unbalanced weight:**  
This subclass is indented under subclass 86. Mechanisms, in which the motion is changed by means of unbalanced weights.

SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, subclasses 366+, for apparatus using unbalanced weights.

241, Solid Material Comminution or Disintegration, subclass 210, for comminutors utilizing this mechanical movement.

- 88 Reciprocating or oscillating to intermittent unidirectional motion:**  
Mechanical Movements for converting reciprocating or oscillating motion to intermittent unidirectional motion.

- 89 Reciprocating or oscillating to or from alternating rotary:**  
Mechanical movement for converting oscillating or reciprocating motion to or from alternating rotary motion, all such motions as defined in the Glossary of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

424.71 through 424.96, for screw and nut devices, per se.

## GLOSSARY

### ALTERNATING MOTION

The intermittent movement along a path, first in one direction and then in the opposite along such path.

### OSCILLATING MOTION

Alternating motion of less than 360 degrees along an arcuate path.

### RECIPROCATING MOTION

Alternating motion along a straight-line path.

### ROTARY MOTION

The turning of a rigid body about an internal axis such that a point on the body travels through an arcuate path, about the axis, having an extent of 360 degrees or more.

#### 89.1 Including inertia device:

This subclass is indented under subclass 89. Mechanical movement comprising movable input and output elements, movable means drivingly interconnecting said elements and a movable member having substantial mass joined to either of said elements or said means by a force-transmitting connection which is effective to vary the speed of the movable member at some time during its operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

83, for other mechanical movement including inertia device.

#### 89.11 With rack and pinion:

Mechanical movement under subclasses 89.1 including a straight or curved member having a series of teeth or recesses to mesh with a gear, such series having determinate effective length.

(1) Note. A gear with minor mutilation taught as being nevertheless continuously usable, without reversal, is not considered to be a rack.

#### 89.12 Rectilinear rack:

This subclass is indented under subclass 89.11. Mechanical movement wherein the rack teeth or recesses lie in a straight line.

#### 89.13 Including bevel gears:

This subclass is indented under subclass 89. Mechanical movement comprising at least one pair of toothed elements, rotatable about non-parallel axes, having meshing toothed surfaces which are inclined to said axes.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
423+, for other mechanism containing bevel gearing.
- 89.14 Including worm:**  
This subclass is indented under subclass 89. Mechanical movement comprising a rotatable screw member for meshing with a complementary toothed gear or rack.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
425+, for other mechanism containing worm gearing.
- 89.16 Including spur gear:**  
This subclass is indented under subclass 89. Mechanical movement comprising a wheel having radially projecting teeth located parallel to the axis of said wheel for meshing with another toothed member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
421, for other mechanism containing spur gearing.
- 89.17 With rack:**  
This subclass is indented under subclass 89.16. Mechanical movement including a straight or curved member having a series of teeth or recesses to mesh with a gear, such series having determinate effective length.
- 89.18 Curvilinear rack:**  
This subclass is indented under subclass 89.17. Mechanical movement wherein the teeth or recesses lie in a curved line.
- 89.19 With biasing means:**  
This subclass is indented under subclass 89.18. Mechanical movement comprising yieldable means which assists the motion of the movement in one direction or the other (e.g., spring, counter weight, etc.).
- 89.2 Including flexible drive connector (e.g., belt, chain, strand, etc.):**  
This subclass is indented under subclass 89. Mechanical movement including a yieldable transmission member engaged with the periphery of a pulley, or of a sprocket or other type wheel.
- SEE OR SEARCH CLASS:  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 266+ for a apparatus for hauling or hoisting a load which includes a driven drum for pulling on or traveling along a cable, and wherein either the drum or the cable is attached to the load.
- 474, Endless Belt Power Transmission Systems or Components, Appropriate subclasses for power transmission via an endless belt.
- 89.21 With sprocket wheel:**  
This subclass is indented under subclass 89.2. Mechanical movement including a member with peripheral cogs or teeth for engaging the flexible drive connector.
- 89.22 With pulley:**  
This subclass is indented under subclass 89.2. Mechanical movement including a sheave or wheel with a grooved rim for receiving and frictionally cooperating with the flexible drive connector in driving or driven relationship.
- 89.23 Including screw and nut:**  
This subclass is indented under subclass 89. Subject matter including mechanical movement comprising a rotatable element having spiral threads or grooves encircling its axis of rotation and a second element enmeshed therewith for relative movement along the axis.
- (1) Note. This subclass requires more (e.g., control of output, etc.) than the mere interaction of a screw and nut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
424.71, for screw and nut gearing, per se.
- 89.24 Shaft shorter than nut:**  
This subclass is indented under subclass 89.23. Subject matter. Subject matter in which the area of meshing engagement of the threads of the screw and nut extends substantially from one end of the thread bearing portion of the screw to the other and the thread bearing portion of the nut is longer than that of the screw.

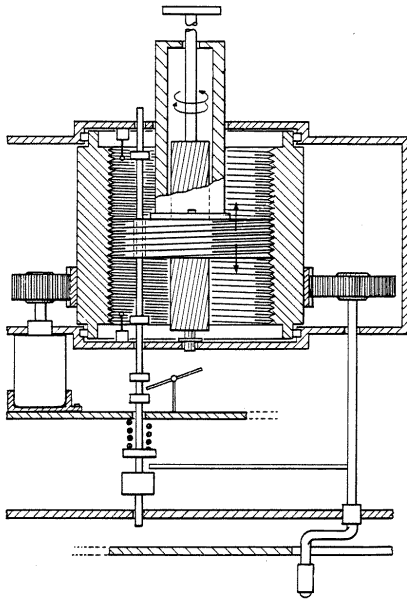


Figure 1. A typical example of the subject matter.

**89.25 Auxiliary drive (e.g., fluid piston, etc.) for load:**

This subclass is indented under subclass 89.23. Subject matter including drive means in addition to drive means for the screw and nut and connected to the same load and capable of moving the nut when the screw and nut are not operating.

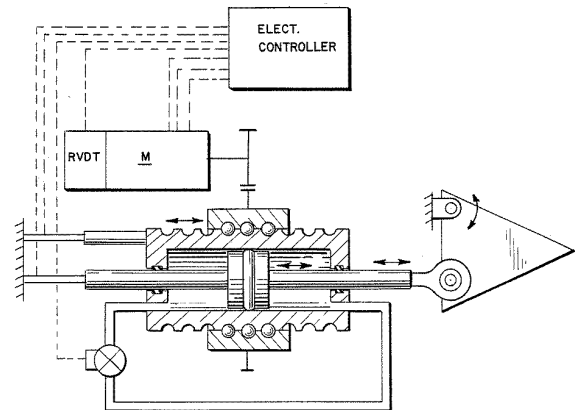


Figure 1. A typical example of the subject matter.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

89.29 through 89.31, for a screw and nut mechanical movement having plural inputs and a single output.

**89.26 Alternate power path operable on failure of primary:**

This subclass is indented under subclass 89.23. Subject matter in which there are plural distinct power paths between an input and output of the mechanism only one of which is active at an initial point in time and the mechanism includes means to activate the other power path upon failure of the initially active one to produce movement of the output.

- (1) Note. The failure may be due to a structural failure of a portion of the mechanism or may be a designed operating mode of the mechanism activated by a change in load or other condition.

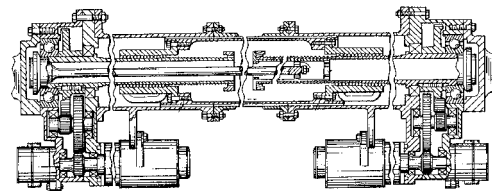


Figure 1. A typical example of the subject matter.

**89.27 Single input split into two intermediate outputs that are subsequently superposed into a single output:**

This subclass is indented under subclass 89.23. Subject matter in which there are two power paths between a single input and a single output of the mechanical movement that are in use simultaneously.

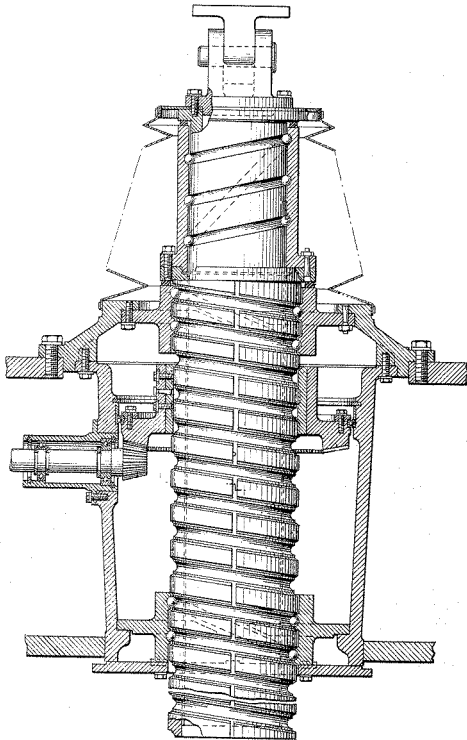


Figure 1. A typical example of the subject matter.

**89.28 Single input, plural outputs:**

This subclass is indented under subclass 89.23. Subject matter in which a single input drives plural outputs.

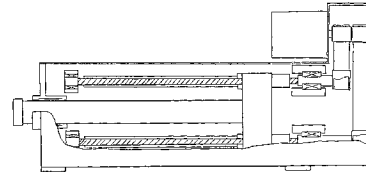


Figure 1. A typical example of the subject matter.

**89.29 Plural inputs, single output:**

This subclass is indented under subclass 89.23. Subject matter including plural power paths between plural inputs and a single output.

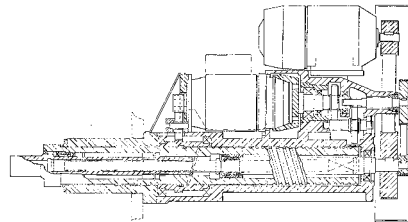


Figure 1. A typical example of the subject matter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

89.25, for a single output independently driven by a screw and nut mechanism and an additional drive mechanism.

**89.3 Plural nuts driving shaft:**

This subclass is indented under subclass 89.29. Subject matter in which there are plural nuts on a single integral shaft, both of which nuts are simultaneously driven to drive the shaft.

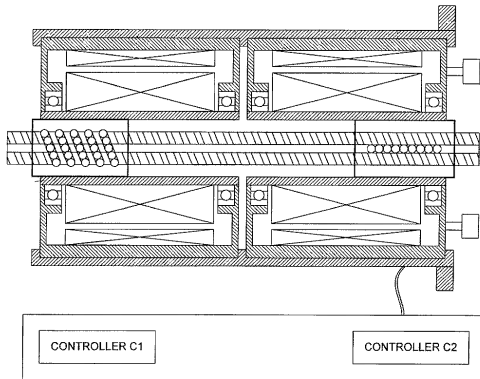


Figure 1. A typical example of the subject matter.

**89.31 Shaft and nut driven:**

This subclass is indented under subclass 89.29. Subject matter in which the shaft and nut are simultaneously driven.

**89.32 Carriage surrounding, guided by, and primarily supported by member other than screw (e.g., linear guide, etc.):**

This subclass is indented under subclass 89.23. Subject matter in which the screw and nut drive a carriage that at least partially surrounds a fixed structure (guide) that supports substantially all of a load on the carriage transverse to the screw.

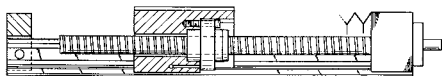
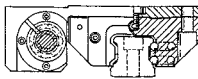


Figure 1. A typical example of the subject matter.

**89.33 Carriage surrounded, guided, and primarily supported by member other than screw (e.g., linear guide, etc.):**

This subclass is indented under subclass 89.23. Subject matter in which the screw and nut drive a carriage that is at least partially surrounded by a fixed structure (guide) that supports substantially all of a load on the carriage transverse to the screw.

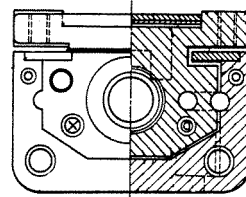


Figure 1. A typical example of the subject matter.

**89.34 Shaft moves through rotary drive means:**

This subclass is indented under subclass 89.23. Subject matter including means for rotating the screw that includes a rotating hollow member through which the screw passes.

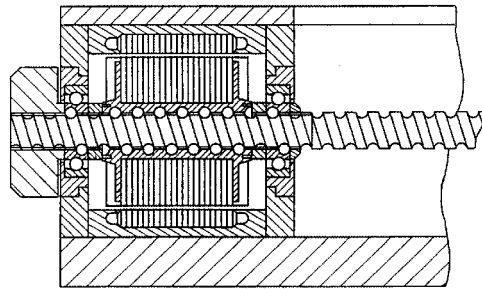


Figure 1. A typical example of the subject matter.

**89.35 Plural screws in series (e.g., telescoping, etc.):**

This subclass is indented under subclass 89.23. Subject matter in which plural screws each associated with a different driving or driven nut form a single power path in which a nut on one screw drives a second screw.



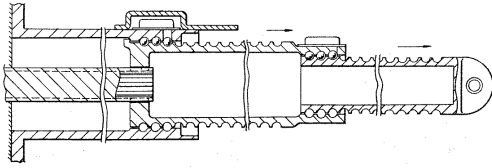


Figure 1. A typical example of the subject.

#### 89.36 Deflection related:

This subclass is indented under subclass 89.23. Subject matter constructed to accommodate, prevent, reduce, or mitigate lateral deflection or misalignment of the screw and nut.

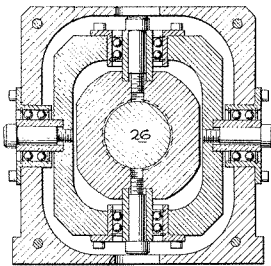


Figure 1. A typical example of the subject matter.

#### 89.37 Limit stop:

This subclass is indented under subclass 89.23. Subject matter including means to stop motion of the output of the screw and nut mechanism at a predetermined position of the output.

- (1) Note. The output position may be predetermined relative to the nut or screw or to a supporting structure for the mechanism.

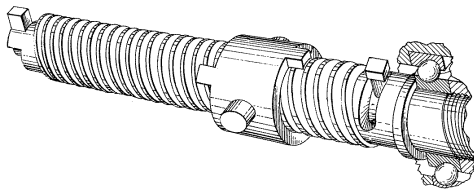


Figure 1. A typical example of the subject matter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 89.38, for a screw and nut mechanical movement having means for interrupting transmission of power from input to output.
- 89.39, for a screw and nut mechanical movement having means to retard or stop the screw or nut.

#### 89.38 Including means to selectively transmit power (e.g., clutch, etc.):

This subclass is indented under subclass 89.23. Subject matter including structure in the power path that may be altered in normal use to assume a state in which it connects two points in the power path so as to be capable of transmitting drive force between the two points and a state in which it is not capable of transmitting such force.

- (1) Note. A brake that selectively prevents rotation of nut relative to shaft so that the nut selectively moves axially of the shaft or rotates with it will be found here.

#### 89.39 Means to selectively lock or retard screw or nut:

This subclass is indented under subclass 89.23. Subject matter including a structure mounted on a stationary support constructed to selectively apply a force to the nut or screw (1) tending to retard the motion of the nut or screw or (2) maintaining the nut or screw in a stationary state.

- (1) Note. A brake that selectively prevents rotation of nut relative to shaft so that the nut selectively moves axially of the shaft or rotates with it will be found elsewhere. See the search notes below. In these devices, the nut is not mounted on a stationary support.

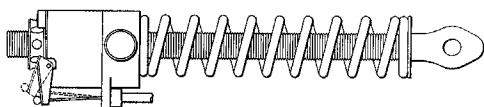


Figure 1. A typical example of the subject matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 89.37, for a limit stop that may include an abutment integral with a screw for halting a nut traveling along the screw.
- 89.38, for a brake that selectively prevents rotation of nut relative to shaft so that the nut selectively moves axially of the shaft or rotates with it. See (1) Note above.

#### 89.4 Contamination related:

This subclass is indented under subclass 89.23. Subject matter including means for impeding the movement of material onto or from the screw or nut from or to the surrounding environment.

- (1) Note. Devices of this subclass may, for example, prevent foreign, potentially damaging, or disrupting particles from entering the space between a screw and nut or may prevent lubricant or the like from being released from the space to the surroundings. Also included are devices that remove contaminants from the screw and nut interface.

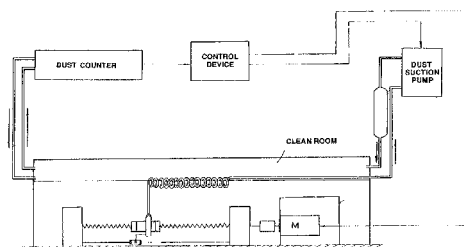


Figure 1. A typical example of the subject matter.

#### 89.41 Imperforate enclosure:

This subclass is indented under subclass 89.4. Subject matter including a barrier surrounding a space containing both the screw and nut so as to prevent movement of material into and out of the space.

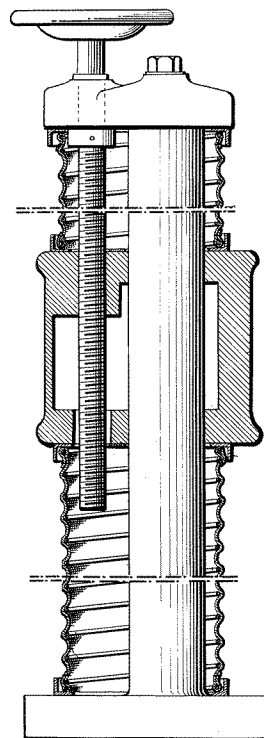


Figure 1. A typical example of the subject matter.

**89.42 Backlash:**

This subclass is indented under subclass 89.23. Subject matter related to reduction or mitigation of play between the threads of the screw and nut.

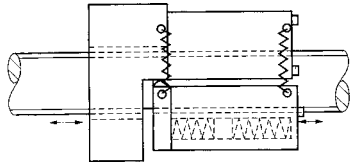


Figure 1. A typical example of the subject matter.

**89.43 Pressurized fluid introduced between nut and screw:**

This subclass is indented under subclass 89.23. Subject matter having structure in the screw or nut for introducing fluid under pressure into the space between the screw and nut so as to maintain a separation between their threads.

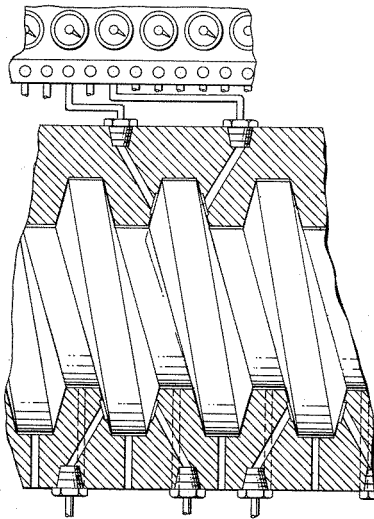


Figure 1. A typical example of the subject matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

89.44, for a screw and nut mechanical movement having means for introducing a lubricant between the screw and nut.

SEE OR SEARCH CLASS:

384, Bearings, subclasses 12 and 100-124 for a fluid bearing.

**89.44 Lubrication:**

This subclass is indented under subclass 89.23. Subject matter in which the screw or nut has specific structure for reducing sliding friction between the screw and nut.

- (1) Note. For example, the structure for reducing sliding friction may be a passage for allowing lubricating fluid to reach the space between the nut and screw or may involve the provision of lubricant impregnated (i.e., self-lubricating) material associated with the nut or screw.

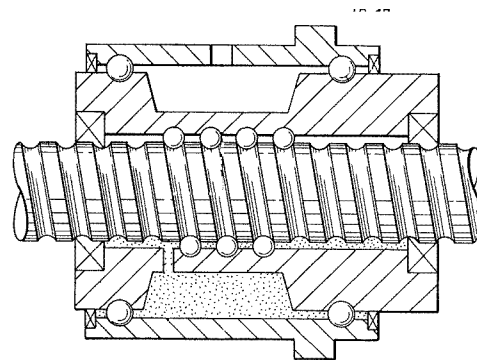


Figure 1. A typical example of the subject matter.

SEE OR SEARCH CLASS:

184, Lubrication, for general purpose lubricating structure.

384, Bearings, subclasses 322 through 415, 462-475, and 606 for lubricating structure specific to a bearing.

**89.45 Manually driven:**

This subclass is indented under subclass 89.23. Subject matter in which the mechanism is constructed to permit a person to supply its input power without the use of tools.

**96 Oscillating to oscillating:**

Mechanical movements for converting oscillating motion to oscillating motion.

**97.1 Snap action:**

This subclass is indented under subclass 96. Mechanism wherein the energy of the driving member is stored during the beginning of the stroke and is imparted to the driven member during the latter part of the stroke to impart a rapid motion to the driven member.

## SEE OR SEARCH CLASS:

- 200, Electricity: Circuit Makers and Breakers, subclasses 402+ for a switch of that class having a movable contact and an actuator, and wherein the contact is quickly or abruptly moved independently of the actuator during actuation, which movement frequently is accomplished by a spring connection between the contact and the actuator.
- 236, Automatic Temperature and Humidity Regulation, subclass 48 for a temperature control valve whose operating force is stored until such time as the valve can be moved suddenly through its total range.
- 251, Valves and Valve Actuation, subclass 75 for a valve having an actuator which imparts to the valve an accelerated motion during a particular portion of its movement.

**97.2 Plate spring:**

This subclass is indented under subclass 97.1. Mechanism wherein the driving member is a thin, resilient element which is in a distorted condition in either one of the two positions which it customarily occupies, and which, when moved by an external force away from one position in the direction of the other position, undergoes a reversal of distortion, resulting in a rapid movement between the two positions.

## SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclass 89.29 for a clutch which is operated by a quick-throw spring.

- 267, Spring Devices, subclass 159 for a device of that class in the nature of a snap spring.

**98 Geared connections:**

This subclass is indented under subclass 96. Mechanisms, in which the motion is changed by means of gears.

**99 Reciprocating to or from oscillating:**

Mechanical movements for converting reciprocating motion to or from oscillating motion.

**100.1 Snap action:**

This subclass is indented under subclass 99. Mechanism wherein the energy of the driving member is stored during the beginning of the stroke and is imparted to the driven member during the latter part of the stroke to impart a rapid motion to the driven member.

## SEE OR SEARCH CLASS:

- 200, Electricity: Circuit Makers and Breakers, subclasses 402+ for a switch of that class having a movable contact and an actuator, and wherein the contact is quickly or abruptly moved independently of the actuator during actuation, which movement frequently is accomplished by a spring connection between the contact and the actuator.
- 236, Automatic Temperature and Humidity Regulation, subclass 48 for a temperature control valve whose operating force is stored until such time as the valve can be moved suddenly through its total range.
- 251, Valves and Valve Actuation, subclass 75 for a valve having an actuator which imparts to the valve an accelerated motion during a particular portion of its movement.

**100.2 Plate spring:**

This subclass is indented under subclass 100.1. Mechanism wherein the driving member is a thin, resilient element which is in a distorted condition in either one of the two positions which it customarily occupies, and which, when moved by an external force away from one position in the direction of the other position, undergoes a reversal of distortion, result-

- ing in a rapid movement between the two positions.
- SEE OR SEARCH CLASS:
- 192, Clutches and Power-Stop Control, subclass 89.29 for a clutch which is operated by a quick-throw spring.
- 267, Spring Devices, subclass 159 for a device of that class in the nature of a snap spring.
- 101 Compound lever and slide:**  
This subclass is indented under subclass 99. Mechanisms, in which the motion is changed by means of a compound lever and slide.
- 102 Lever and slide:**  
This subclass is indented under subclass 99. Mechanisms, in which the motion is changed by means of a lever and slide.
- 103 Straight line motions:**  
This subclass is indented under subclass 102. Mechanisms, in which the motion is changed by means of a lever and slide and the path of the reciprocating member is a straight line.
- 104 Slidable connections:**  
This subclass is indented under subclass 102. Mechanisms in which the motion is changed by means of a lever and slide and the connection between the lever and slide is slidable.
- 105 Link connections:**  
This subclass is indented under subclass 102. Mechanisms, in which the motion is changed by means of a lever and slide which are connected together by a link.
- 106 Toggle transmissions:**  
This subclass is indented under subclass 102. Mechanisms, in which the motion is changed by means of a lever and slide which are connected together by a toggle.
- SEE OR SEARCH CLASS:
- 81, Tools, subclasses 363 and 367+ for toggle-actuated pliers.
- 107 Cam connections:**  
This subclass is indented under subclass 102. Mechanisms, in which the motion is changed by means of a lever and slide which are connected together by cams.
- 108 Flexible connections:**  
This subclass is indented under subclass 102. Mechanisms, in which the motion is changed by means of a lever and slide which are connected together by a flexible member.
- 109 Rack and pinion:**  
This subclass is indented under subclass 99. Mechanisms, in which the motion is changed by means of a rack and pinion.
- 110 Reciprocating to reciprocating:**  
Mechanical movements for changing reciprocating motion to reciprocating motion.
- 111 MECHANICAL MOVEMENTS (INTERMITTENT GRIP TYPE):**  
This subclass is indented under the class definition. Mechanisms, provided with parts adapted to impart step-by-step motion to a unidirectionally driven member.
- (1) Note. For intermittent grip devices, of special application, see the arts to which they are applied.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 84, 435, and 436, for specialized forms of intermittent grip mechanisms.
- SEE OR SEARCH CLASS:
- 72, Metal Deforming, subclass 422 + for machines for feeding metal stock having intermittently reciprocated gripping mechanisms which grasp the bar of stock, advance to feed the same to a chuck, then release the stock, and return to their first position.
- 81, Tools, subclass 314 for pliers with incremental jaw movement.
- 188, Brakes, subclasses 82.1+, for brakes applied to elements rotating relative to stationary elements to prevent retrograde rotation while allowing forward rotation.
- 368, Horology: Time Measuring Systems or Devices, subclass 75, for electric clocks having an intermittent striking signal.

- 112 Rotary to intermittent unidirectional motion:**  
This subclass is indented under subclass 111. Mechanisms having a rotary driving member and provided with parts adapted to impart step-by-step motion to a unidirectionally driven member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
84, for nonintermittent grip type movements for changing rotary and intermittent unidirectional movement.  
435, for mutilated rotary gear bodies. 436, for Geneva gears.
- SEE OR SEARCH CLASS:  
352, Optics: Motion Pictures, subclasses 187+ and 191+ for intermittent feed mechanisms for motion picture apparatus.
- 113 Automatically controlled:**  
This subclass is indented under subclass 112. Mechanisms in which the transmission ratio is controlled automatically.
- 114 Speed:**  
This subclass is indented under subclass 113. Mechanisms in which the transmission ratio is controlled automatically by speed responsive elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
601, for automatically adjustable cranks and wrist pins.
- 116 Rotary crank or eccentric drive:**  
This subclass is indented under subclass 112. Mechanisms having a rotary crank or eccentric driving member and provided with parts adapted to impart step-by-step motion to a unidirectionally driven member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
118, 120, and 510, for eccentric features.  
595+, for crank features.
- 117 Adjustable:**  
This subclass is indented under subclass 116. Mechanisms, having an adjustable driving member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
121, for other adjustable throw cranks and eccentrics.  
571.1, for adjustable eccentrics.  
600, for adjustable cranks.
- 118 Lever transmitter:**  
This subclass is indented under subclass 116. Mechanisms in which the parts include an intermediate lever pivoted to some supporting structure.
- 119 Adjustable leverage:**  
This subclass is indented under subclass 118. Mechanisms, in which the parts include an intermediate lever of adjustable ratio pivoted to some supporting structure.
- 120 Rack and pinion transmitter:**  
This subclass is indented under subclass 116. Mechanisms, in which the parts include rack and pinion transmitting elements.
- 121 Adjustable throw:**  
This subclass is indented under subclass 120. Mechanisms, in which the parts include rack and pinion transmitting elements, and means are provided for varying the extent of effective movement of those elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
117, for adjustments other than by changing the throw for this mechanical movement.
- 122 Rotary cam drive:**  
This subclass is indented under subclass 116. Mechanisms, having a rotary cam driving member and provided with parts adapted to impart step-by-step motion to a unidirectionally driven member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
567+, for cams, per se.

- 123 Adjustable throw:**  
This subclass is indented under subclass 122. Mechanisms, in which the extent of movement of the transmitting parts may be varied.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
60, for wobble type mechanical movements.  
568, for adjustable cams.
- 124 Radial cam:**  
This subclass is indented under subclass 123. Mechanisms and having a radial cam.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
125, for other radial cam actuators.  
568, for adjustable cams.
- 125 Radial cam:**  
This subclass is indented under subclass 122. Mechanisms and having a radial cam.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
567+, for cams.
- 125.5 Intermittently engaged clutch:**  
This subclass is indented under subclass 112. Mechanisms in which the parts include periodically engageable clutch elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
322, through 324, for alternatively rotary gearing involving clutchable gears.
- 126 Oscillation or reciprocation to intermittent unidirectional motion:**  
This subclass is indented under subclass 111. Mechanisms and having either an oscillating or reciprocating driving member and provided with parts adapted to impart step-by-step motion to a unidirectionally driven member.
- 127 Screw and nut devices:**  
This subclass is indented under subclass 126. Mechanisms, in which the parts include relatively movable screw and nut elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
57+, for nonintermittent grip type movements involving axially grooved cams, and slides.
- 128 Slide actuator:**  
This subclass is indented under subclass 126. Mechanisms, in which the driving member is in the form of a slidable actuator.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
160+, for slide gripper mountings.
- 129 Multiple acting:**  
This subclass is indented under subclass 128. Mechanisms, in which a slidable actuator is adapted to impart motion to the driven member in both directions of its movement or in which a plurality of slidable actuators are adapted to impart motion to the driven member in sequence.
- 130 Rack actuator:**  
This subclass is indented under subclass 126. Mechanisms, in which the driving member is provided with rack teeth.
- SEE OR SEARCH CLASS:  
401, Coating Implements With Material Supply, subclass 66, for a pencil, or the like, including a rack and pawl mechanism for advancing a piece of lead step-by-step to compensate for attrition.
- 131 Multiple acting:**  
This subclass is indented under subclass 130. Mechanisms, in which a single driving member having rack teeth is capable of imparting motion to the driven member in both directions of its movement or in which a plurality of driving members having rack teeth are adapted to impart motion to the driven member in sequence.
- 132 Inwardly facing racks:**  
This subclass is indented under subclass 131. Mechanisms, in which the driving member is provided with inwardly facing rack teeth and is effective in both directions of its movement to impart motion to the driven member.

- 133 Oscillating:**  
This subclass is indented under subclass 130. Mechanisms, in which the rack is oscillatable.
- 134 Multiple acting:**  
This subclass is indented under subclass 133. Mechanisms, in which the oscillatable rack is adapted to impart motion to the driven member in both directions of its movement or in which a plurality of oscillatable racks are adapted to impart motion to the driven member in sequence.
- 135 Inwardly facing racks:**  
This subclass is indented under subclass 134. Mechanisms, in which the rack is provided with inwardly facing teeth and is effective in both directions of its movement.
- 136 Multiple acting:**  
This subclass is indented under subclass 126. Mechanisms, in which a single driving member in the form of a strap, chain, belt, etc., is adapted to impart motion to the driven member in both directions of its movement or in which a plurality of straps are adapted to impart motion to the driven member in sequence.
- 137 Spring or weight return:**  
This subclass is indented under subclass 136. Mechanisms, in which a spring or weight moves the strap in one direction.
- 138 Single acting:**  
This subclass is indented under subclass 126. Mechanisms, in which the driving member is in the form of a strap, chain, or belt and is effective in only one direction of movement to impart motion to the driven member.
- 139 Engine starter type:**  
This subclass is indented under subclass 138. Mechanisms in which the entire device is particularly designed for uses as an engine starter but is adapted for other uses.
- (1) Note. This subclass includes only the intermittent grip type of engine starters capable of general use.
- (2) Note. If the use is limited to engine starting, see the appropriate starter classes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
6+, for engine starters and see (1) Note supra.
- SEE OR SEARCH CLASS:  
123, Internal-Combustion Engines, sub-classes 185.1+, for mechanical starters, and see (1) Note supra.
- 140 Spring or weight return:**  
This subclass is indented under subclass 139. Mechanisms, in which a spring or weight is adapted to return the strap to its initial position.
- SEE OR SEARCH CLASS:  
123, Internal Combustion Engines, sub-classes 185.1+, for mechanical starters, and see (1) Note supra.
- 141 Spring or weight return:**  
This subclass is indented under subclass 138. Mechanisms, in which a spring or weight is adapted to return the strap to its initial position.
- 141.5 Lever actuator:**  
This subclass is indented under subclass 126. Mechanisms in which the driving member is a lever effective in its oscillation to impart motion to the driven member.
- (1) Note. It should be noted that the movement of the lever and driven element is relative. Hence, if the "driven" element is held or fixed, and the support or pivot of the lever is compelled to move in the required manner by the oscillation or reciprocation of the lever, such structure will satisfy the terms of this definition.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
156+, for lever gripper mountings.
- SEE OR SEARCH CLASS:  
254, Implements or Apparatus for Applying Pushing or Pulling Force, sub-classes 31, 105+, 206+, 210, 237+, and 245 for similar mechanisms for imparting a step-by-step movement to a traveling bar or rack.



**142 Rotary driven element:**

This subclass is indented under subclass 141.5. Mechanisms in which the intermittently driven member revolves around a relatively fixed axis.

**143 Multiple acting:**

This subclass is indented under subclass 142. Mechanisms in which a single driving member in the form of a lever, is adapted to impart motion to the driven member in both directions of oscillation of the lever or in which a plurality of levers are adapted to impart motion to the driven member in sequence.

SEE OR SEARCH THIS CLASS, SUBCLASS:

158+, for multiple acting lever gripping mountings.

**144 Grip units and features:**

This subclass is indented under subclass 111. Devices, adapted to form parts of more complex intermittent grip mechanisms and to impart step-by-step motion directly to a unidirectionally driven member.

- (1) Note. The line between these subclasses and Class 192, Clutches and Power-Stop Control, subclass 41, with respect to one way clutches and clutch operators is as follows: Class 192, will take the clutch, per se, with or without the clutch operator. The inclusion of additional elements; e.g., a holding pawl for the part driven by the clutch, will cause classification in this class (74).

SEE OR SEARCH THIS CLASS, SUBCLASS:

505, for hand operated gear, drum and cable controllers.

575, for pawls and ratchets, per se.

SEE OR SEARCH CLASS:

81, Tools, subclasses 58+, for clutched head wrenches or screwdrivers, and subclasses 28+ for a ratchet bit stock.

188, Brakes, subclasses 82.1+, for brakes applied to elements rotating relative to stationary elements to prevent retrograde rotation while allowing forward rotation.

192, Clutches and Power-Stop Control, for one way clutches and actuators, and see (1) Note supra.

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 108+, 206+, and 237+ for pawl operated step-by-step traveling bar type implements or apparatus.

368, Horology: Time Measuring Systems or Devices, subclasses 59+ for secondary electric clock mechanism.

401, Coating Implements With Material Supply, subclasses 65+, for a pencil or the like, including a chuck for advancing a piece of lead step-by-step to compensate for attrition.

**145 Compound movement handle:**

This subclass is indented under subclass 144. Devices, including a handle capable of movement in a plurality of planes.

**146 Reversible:**

This subclass is indented under subclass 145. Devices, including a handle capable of movement in a plurality of planes and adapted to impart either forward or reverse motion to the driven member.

**147 Transverse pivots:**

This subclass is indented under subclass 145. Devices, in which the handle is swingable about an axis transverse to the axis of rotation of the driven member.

**148 Gripper releasing devices:**

This subclass is indented under subclass 144. Devices, in which means are provided for releasing a gripper from the driven member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

679, for gearing having this mechanical movement in one of a plurality of power paths to or from the gearing.

SEE OR SEARCH CLASS:

188, Brakes, subclass 82.3, for one-way brakes which include means to render them inoperative to prevent retrograde motion of a rotating member.

- 475, Planetary Gear Transmission Systems or Components, subclass 217 for disc and wheel type gearing in one of plural power paths to planetary gearing.
- 149 Power pawl lifter:**  
This subclass is indented under subclass 148. Devices, in which the pawl disengaged is the driving or power transmitting pawl.
- 150 Automatic:**  
This subclass is indented under subclass 149. Devices, in which means are provided for automatically disengaging a power transmitting pawl from the driven member.
- 151 Idle stroke:**  
This subclass is indented under subclass 150. Devices, in which means are provided for automatically disengaging a power transmitting pawl from the driven member during the idle or return movement of the pawl.
- 152 Cooperating holding pawl:**  
This subclass is indented under subclass 151. Devices, in which a holding pawl is adapted to prevent retrograde movement of the driven member.
- SEE OR SEARCH CLASS:  
235, Registers, subclass 131, for overthrow preventers.
- 153 Power stroke:**  
This subclass is indented under subclass 150. Devices, in which means are provided for automatically disengaging a power transmitting pawl from the driven member during the power or working movement of the pawl.
- 154 Cooperating holding pawl:**  
This subclass is indented under subclass 149. Devices, in which means are provided for disengaging a power pawl from the driven member and an auxiliary holding pawl is adapted to prevent retrograde movement of the driven member.
- 155 Holding pawl lifter:**  
This subclass is indented under subclass 148. Devices, provided with a holding pawl for preventing retrograde movement of the driven member, the said holding pawl being disengaged from the driven member by the movement of some part of the device.
- 156 Gripper mountings, lever:**  
This subclass is indented under subclass 144. Devices, in which the element which engages the driven member is mounted on a lever actuator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
118+, and 142+, for lever actuated intermittent grip type devices.
- 157 Reversible:**  
This subclass is indented under subclass 156. Devices, in which the element which engages the driven member may be shifted to impart either forward or reverse motion to the driven member.
- 158 Multiple acting:**  
This subclass is indented under subclass 156. Devices, in which a plurality of elements are adapted to engage one or more driven members and are mounted on one or more lever actuators.
- 159 Single ratchet or clutch:**  
This subclass is indented under subclass 158. Devices, in which the driven member is in the form of a single ratchet or clutch to provide only one set of teeth for cooperation with the plurality of elements.
- 160 Gripper mountings, slide:**  
This subclass is indented under subclass 144. Devices, having the element adapted to engage the driven member mounted on a slidable actuator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
128, for other slide actuators.
- 161 Multiple acting:**  
This subclass is indented under subclass 160. Devices, in which a plurality of elements are adapted to engage one or more driven members and are mounted on one or more slide actuators.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
129, for other multiple acting slide actuators.
- 162 Grip features:**  
This subclass is indented under subclass 144. Devices, limited to the combination of the details of the power imparting element, per se, and the driven member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
575+, for pawls and ratchets, per se.
- SEE OR SEARCH CLASS:  
81, Tools, subclasses 58+, for clutched head wrenches or screwdrivers, and subclasses 28+ for a ratchet bit stock.  
192, Clutches and Power-Stop Control, subclasses 41+, for automatic one way engaging clutches.
- 163 Driving band:**  
This subclass is indented under subclass 162. Devices, in which the power imparting element is in the form of a band surrounding the driven member.
- 164 Clamping:**  
This subclass is indented under subclass 163. Devices, in which the power imparting element is in the form of a band surrounding the driven member and which actuates the driven member intermittently by being clamped thereto and unclamped therefrom.
- 165 Driven band and gripper:**  
This subclass is indented under subclass 162. Devices, in which the driven member is in the form of an endless band, such as a chain or belt.
- 166 Positive grip:**  
This subclass is indented under subclass 165. Devices, provided with means to prevent slippage between the power imparting elements and the driven member.
- 167 Driving ratchet-bar or rack:**  
This subclass is indented under subclass 162. Devices, in which the power imparting element is in the form of a ratchet bar or rack.
- 168 Multiple acting:**  
This subclass is indented under subclass 167. Devices, in which a plurality of power imparting elements in the form of ratchet bars or racks actuate the driven member.
- 169 Driven ratchet-bar and power dog:**  
This subclass is indented under subclass 162. Devices, in which the power imparting element is in the form of a pawl adapted to cooperate with the teeth of a ratchet bar which comprises the driven member.
- SEE OR SEARCH CLASS:  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 108+, 206+, and 237+ for pawl operated step-by-step traveling bar type implements or apparatus.
- Gearing Frictional.**  
This subclass is indented under subclass 640. Gearing, comprising rotary elements having substantially smooth surfaces in contact with each other, or in line or point contact with an interposed member, to produce a relative rolling motion between them due to contact of surfaces.
- 216.3 Toothed gear and recirculated unconnected elements:**  
This subclass is indented under subclass 640. Gearing which includes a guide tube in the form of a closed path, a plurality of free running independent bodies (e.g., balls) within and substantially filling said tube, and one or more notched rotary elements tangentially engaging the bodies axially of the run thereof to thereby transmit and/or receive power axially of the run by the compressive action of the bodies upon each other in the forward run of the path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
458+, for worm and helical gearing in which power is transmitted through the medium of balls received in pockets formed by the grooves of the meshing gears and in which the balls serve as antifriction elements.  
499, and 500, for the gearing there classified and including the use of balls as

antifriction elements between the meshing grooves of the gears.

SEE OR SEARCH CLASS:

60, Power Plants, subclass 326, for a motor driven by a recirculated motive fluid comprising a mixture, suspension or semi-solid.

**318 Alternating rotary or continuous:**

This subclass is indented under subclass 640. Gearing combinations comprising one or more trains of gears for converting the continuous rotation of a driving gear to an alternating rotation of a driven element and in which additional elements may be provided for continuing the rotation of the driven element in one direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

70+, for rotary to alternating rotary mechanical movements.

**319 Alternating rotary:**

This subclass is indented under subclass 640. Gearing combinations comprising one or more trains of gears for converting the continuous rotation of a driving element to an alternating rotation of a driven element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

70+, for rotary to alternating rotary mechanical movements.

**320 Progressive:**

This subclass is indented under subclass 319. Gearing, in which the driven element is rotated a greater amount in one direction than in the other.

**321 Shiftable and/or slidable gears:**

This subclass is indented under subclass 319. Gearing, embodying shiftable and/or slidable gears for effecting an alternating rotation of the driven member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

355, for interchangeably locked, single forward and reverse speed gearing.

**322 Clutchable gears:**

This subclass is indented under subclass 319. Gearing, embodying engageable and disengageable clutches for effecting an alternating rotation of the driven members.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

125.5, for clutch operated mechanical movements of the rotary to intermittent unidirectional type.

361, and 376+, for forward and reverse interchangeably locked gearing involving clutches.

SEE OR SEARCH CLASS:

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 1+ for a control for reversing the direction of rotation of an output shaft in a belt and pulley drive system.

**323 On single driven member:**

This subclass is indented under subclass 322. Alternating rotary gearing, in which the clutches are all mounted on the alternating driven member.

**324 On single driving member:**

This subclass is indented under subclass 322. Alternating rotary gearing, in which the clutches are all mounted on the continuously rotating driving member.

**325 Interchangeably locked:**

This subclass is indented under subclass 640. Transmissions in which a plurality of speeds are transmitted from one shaft to another by optionally engaging or meshing selected gears or clutches or gears and clutches, to their supporting shafts.

(1) Note. These transmissions include those which provide speed changes (1) by means of interchanging meshed gears on their shafts or (2) by replacing such gears with gears of different sizes.

(2) Note. Such gearing is found in various arts, for examples of which see the Search Notes below.

## SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 27+, for lathes of the combined machine type and (see Note 2).
- 82, Turning, subclass 29, for change speed gear for headstocks. (See Note 2).
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 124+, for drilling machines having miscellaneous drives. (See Note 2).
- 409, Gear Cutting, Milling, or Planing, subclasses 64+, for milling machines. (See (2) Note).

**329 Disconnectable counter shaft:**

This subclass is indented under subclass 325. Transmissions involving change of speed in which the counter shaft is disconnected from the drive shaft when the drive is not through the counter shaft.

**330 Multiple concentric clutch shafts:**

This subclass is indented under subclass 325. Transmissions either (1) wherein the drive from the prime mover to the transmission is through a manually selected one of a plurality of concentric drive shafts, each of which has a clutch for engagement with the engine clutch; or (2) wherein the drive from the transmission to the propeller shaft is by means of a manually selected one of a plurality of concentric driven shafts each of which has a clutch for engagement with a clutch on the propeller shaft.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 336+, for automatic speed responsive interchangeably locked gearing.
- 363+, for spur gear type, progressive multiple key, single clutch shaft interchangeably locked gearing.

## SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 48.1+ for plural clutch-assemblages, 52.1+ for a progressive engagement clutch, and 103+ for a speed-responsive clutch.

**331 Plurality of counter shafts:**

This subclass is indented under subclass 325. Transmission in which the change of speed from the drive shaft to the driven shaft may be through a selected one of a plurality of counter shafts.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 333, for combined gear and clutch type interchangeably locked gearing.
- 343, for selective, longitudinally slidable direct clutch and drive type interchangeably locked gearing.
- 359, for selective, multiple clutch shaft, interchangeably locked gearing.
- 373+, for selective, single clutch shaft, interchangeably locked gearing.

**332 Internal-external gears:**

This subclass is indented under subclass 325. Transmissions wherein the transmission of power from the drive shaft to the driven shaft is by means of internal-external gears in conjunction with shiftable gears, or shiftable clutches, with constantly meshed gears, or both, in a single unit.

**333 Combined gear and clutch:**

This subclass is indented under subclass 325. Transmissions composed of shiftable gears, and shiftable clutches, or shiftable gears provided with clutch elements, all in one gearing combination, wherein selected gears or clutches are manually shifted into or out of mesh with cooperating gears or clutches.

## SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclass 20, for combined clutches and gears, where the gearing controls the clutch.

**334 Preselector:**

This subclass is indented under subclass 333. Transmissions, wherein the selected gears or clutches are manually shifted into or out of mesh with cooperating gears or clutches by operation of a clutch pedal after a separate pre-selective change speed device has been set.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
474, for pedal-operated devices.

**335 Control mechanism:**

This subclass is indented under subclass 325. Transmissions composed of shiftable gears, or shiftable clutches with constantly meshed gears, or shiftable gears and shiftable clutches, wherein the shifting is accomplished by mechanical power driven means.

**336 Speed responsive:**

This subclass is indented under subclass 335. Transmissions, wherein the shifting is accomplished either by means responsive to the speed of some part of the transmission or by means responsive to both speed and torque conditions of the transmission.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 103+, for speed responsive clutches.  
475, Planetary Gear Transmission Systems or Components, subclasses 254+ for condition responsive control of planetary gearing.

**336.5 Governor:**

This subclass is indented under subclass 336. Transmissions, wherein the shifting is accomplished by a governor responsive to the speed of some part of the transmission.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

404.5, for governor controlled reverse gearing.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 488+ for a speed responsive device, per se.

**337 Torque responsive:**

This subclass is indented under subclass 335. Transmissions, wherein the shifting is automatically accomplished by means operated in response to either the torque of the engine or of the driven shaft.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 54.1+, for torque responsive clutches.

**337.5 Cam operated:**

This subclass is indented under subclass 335. Transmissions, wherein the shifting is accomplished by means of a manually operable cam which is connected to the shiftable member so that operation of the cam produces progressive changes in gear ratios.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclass 93, for cam operators for clutches.

**339 Meshing assisters:**

This subclass is indented under subclass 325. Transmissions, wherein a means is provided for synchronizing the speed of the member which is being shifted with the speed of the member to be engaged by the shiftable member prior to engagement thereof.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 53.1+.

**340 Double clutch and interposed transmission:**

This subclass is indented under subclass 339. Transmissions, having a clutch at each end thereof, which are simultaneously engaged or disengaged to simultaneously engage the transmission as a unit with or disengage it from the engine and the propeller shaft.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 48.1+ for plural clutch-assemblages and synchromesh mechanism associated therewith.

**Interchangeably locked, Longitudinally slidable:**

This subclass is indented under subclass 325. Transmissions wherein one or more gears may be moved along the axis of rotation into mesh with cooperating gears.

**341 With tumbler gear:**

Transmissions under Longitudinally slidable composed of multiple spur gears on a tumbler carrier for cooperating with different sized driving and driven gears.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

348+, for longitudinally slidable bevel gears in cone form mounted on a tumbler carrier.

SEE OR SEARCH CLASS:

82, Turning, subclasses 140, 143 and 905, for change speed gearing used in lathes.

408, Cutting by Use of Rotating Axially Moving Tool, subclasses 124+, for drilling machines including drive structure.

409, Gear Cutting, Milling, or Planing, subclasses 64+ for a milling machine including drive structure.

**342 Selective:**

Transmissions under Longitudinally slidable composed of selective, multiple, sliding spur gears on a plurality of shafts.

**343 Direct clutch and drive:**

This subclass is indented under subclass 342. Transmissions, but having means to directly clutch the drive and driven shafts together.

**344 Progressive:**

Transmissions under Longitudinally slidable composed of multiple sliding spur gears on a plurality of shafts, which gears may be shifted manually to provide a progressive plurality of speeds.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

337.5, for cam operated controls for interchangeably locked gearing.

**345 Direct clutch and drive:**

This subclass is indented under subclass 344. Transmissions, but which have means to directly clutch together the drive and driven shafts.

**346 Fluid operated:**

Transmissions under Longitudinally slidable containing a plurality of slidable spur gears which are adapted to be shifted into and out of engagement by fluid pressure means under manual control.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

334, for preselected combined clutch and gear, interchangeably locked gearing.

336+, for automatic speed responsive interchangeably locked gearing.

**347 Multiple bevel gears:**

Transmissions under Longitudinally slidable composed of a plurality of slidable bevel gears which may mesh with a disk or with other bevel gears.

**348 Tumbler and cone:**

Transmissions under Longitudinally slidable comprising a plurality of spur gears of varying diameters arranged on a single shaft in cone form, and a single slidable spur tumbler gear adapted to be progressively slid into mesh with the gears of the cone whereby either the tumbler, or any one of the cone gears, may be driven by the other in mesh therewith.

(1) Note. The teeth on the cone gears may be radially or spirally disposed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

341, for tumbler type spur gears longitudinally slidable.

**349 Multiple cone:**

This subclass is indented under subclass 348. Transmissions in which a plurality of cone type gears are used and the single slidable tumbler gear is interposed between the cone type gears and acts to transmit power from one to the other.

**350 Single bevel gear:**

Transmissions under Longitudinally slidable in which there is a single slidable bevel gear in mesh with a toothed disk, or one of a plurality of bevel gears for changing the speed.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
347, for multiple bevel gears which are longitudinally slidable.
- 351 Pin or crown gears:**  
Transmissions under Longitudinally slidable in which pin or crown gears, either single or multiple, are shifted to provide a change of speed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
415, for the construction of the pin gear, per se.
- 352 Laterally slidable gears:**  
This subclass is indented under subclass 325. Transmissions wherein the gears are supported by a shiftable carrier whereby the gears may be moved laterally with respect to the longitudinal axis of the transmission into mesh with cooperating gears.
- 353 Rotary carriage:**  
This subclass is indented under subclass 352. Transmissions wherein the gears are supported by a rotary carrier and are adapted to be moved laterally into mesh with cooperating gears.
- 354 Swinging carriage:**  
This subclass is indented under subclass 352. Transmissions wherein the gears are supported by a swingable carrier and are adapted to be moved laterally into mesh with cooperating gears.
- 355 Single forward and reverse speeds:**  
This subclass is indented under subclass 325. Transmissions wherein a single forward or a single reverse speed is obtained by means of slidable toothed gears of any type.
- 356 Alternative clutch shaft:**  
This subclass is indented under subclass 325. Transmissions composed of a single shiftable driving shaft which can be progressively or selectively clutched to any one of a plurality of intermediate shafts or counter shafts, which in turn are connected by constant mesh gearing to a final driven shaft, the drive shaft and the intermediate shafts or counter shafts being provided with cooperating clutch faces.
- 357 Progressive:**  
This subclass is indented under subclass 325. Transmissions wherein there are a plurality of slidable keys or clutches splined to a plurality of shafts which are connected to each other by constant mesh gears revoluble on the shafts, and provided with clutch elements adapted to be engaged by the slidable clutches or keys, the keys or clutches being manually shifted in a manner to provide a progressive change in gear ratio.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
337.5, for cam operated controls for interchangeable locked gearing.  
363, for progressive transmissions utilizing a single clutch shaft.
- 358 Keys simultaneously slidable:**  
This subclass is indented under subclass 357. Transmissions, wherein the slidable keys or clutches are manually operated simultaneously to provide progressive changes in gear ratios.
- 359 Selective:**  
This subclass is indented under subclass 325. Transmissions wherein there are a plurality of slidable keys or clutches splined to a plurality of shafts which are connected to each other by constant mesh gears revoluble on the shafts, and provided with clutch elements adapted to be engaged by the slidable clutches or keys, the slidable keys or clutches being manually shifted to provide selected changes in gear ratios.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
373+, for selective, single clutch shaft, interchangeably locked gearing.
- 360 Multiple forward and reverse:**  
This subclass is indented under subclass 325. Transmissions wherein there are a plurality of manually operable slidable keys or clutches splined to a plurality of shafts which are connected to each other by constant mesh gears revoluble on the shafts, the gears being provided with clutch elements adapted to be engaged by the slidable clutches or keys to provide a plurality of selective forward speeds and a plurality of reverse speeds.



**361 Single forward and reverse:**

This subclass is indented under subclass 325. Transmissions wherein there are a plurality of manually operable slidable keys or clutches splined to a plurality of shafts which are connected to each other by constant mesh gears, revoluble on the shafts, the gears being provided with clutch elements adapted to be engaged by the slidable clutches or keys to provide a single forward speed and a single reverse speed.

**362 Multiple key:**

This subclass is indented under subclass 325. Transmissions where there are a plurality of manually operable slidable keys or clutches splined to a single clutch shaft, the clutch shaft being connected to the other shafts of the transmission by constant mesh gears revoluble on the shafts, which shafts have clutch elements adapted to be engaged by the slidable keys or clutches to provide progressive change in gear ratios.

**363 Spur:**

This subclass is indented under subclass 362. Transmissions, in which the rotatable constantly meshed gears are of the spur type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 336+, for automatically controlled interchangeably locked gearing.
- 337, for torque responsive interchangeably locked gearing.

**364 Fluid operated:**

This subclass is indented under subclass 363. Transmissions, in which the clutches or keys are shifted by manually controlled fluid operated means, or the clutches are of the fluid type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 334, for preselector type combined clutch and gear, interchangeably locked gearing.
- 346, for fluid operated longitudinally slidable interchangeably locked gearing.
- 730, and see (1) Note thereto for the distinction between a fluid clutch and a fluid drive.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 85+, for fluid pressure operators for clutches.

**365 Electrically operated:**

This subclass is indented under subclass 363. Transmissions, where the clutches or keys are shifted by manually controlled electrically operated means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 334, for preselector type combined clutch and gear, interchangeably locked gearing.
- 336.5, for governor controlled interchangeably locked gearing.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 40 and 84.1+, for electrically controlled clutches.

**366 Single key:**

This subclass is indented under subclass 325. Transmissions wherein there are constant mesh gears, some of which are rotatably mounted on a shaft and adapted to be clutched to the shaft by a single clutch or key which is manually shifted to provide progressive changes in gear ratio.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 337.5, for cam operated controls for interchangeably locked gears.

**368 Clutch and ratchet:**

This subclass is indented under subclass 366. Transmissions comprising a gear train connecting driving and driven shafts and a manually operable positive clutch for directly connecting the shafts, together with a one-way clutch in the gear train which acts like a ratchet mechanism which permits the gear train to overrun when the shafts are directly coupled together.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 336+, for automatically controlled interchangeably locked gears.

- 337, for torque responsive interchangeably locked gears.
- 369 Spur gears:**  
This subclass is indented under subclass 366. Transmissions, wherein the gears of the transmission are spur gears.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
363, for progressive transmissions utilizing a single clutch shaft.
- 370 Intermediate clutch:**  
This subclass is indented under subclass 369. Transmissions, providing two speeds only, wherein constant mesh spur gears connect the drive and driven shafts, the gears being loosely mounted on the shafts and being adapted to be connected to their respective shafts by a single manually operable slidable key or clutch intermediate the loosely mounted gears.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
368, for clutch and ratchet, and single key, single clutch shaft, progressive interchangeably locked gearing.  
377, for spur type, single forward and reverse, single clutch shaft, interchangeably locked gearing.
- 371 Sliding clutch carrier:**  
This subclass is indented under subclass 369. Transmissions comprising a plurality of spur gears loosely mounted on a hollow shaft, the gears meshing with cooperating spur gears fixed to a second shaft, and also comprising a member slidably mounted in the hollow shaft, which member carries a single clutch element, the latter of which is manually shiftable to progressively and successively clutch the loose gears to the shaft on which they are mounted.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
336+, for automatically controlled interchangeably locked gearing.  
336.5, for governor controlled interchangeably locked gears.  
372, for spur gear, sliding clutch operator, single key, single clutch shaft progressive interchangeably locked gearing.
- SEE OR SEARCH CLASS:  
192, Clutches and Power-Stop Control, subclasses 52.1+, for progressive engaging clutches and subclasses 65 and 66.1+ for axially engaging clutches.
- 372 Sliding clutch operator:**  
This subclass is indented under subclass 369. Transmissions comprising a plurality of spur gears loosely mounted on a hollow shaft, the gears meshing with cooperating spur gears fixed to a second shaft, and also comprising a member slidably mounted in the hollow shaft, the gears carrying clutches and the slidable member carrying means for operating the clutches to progressively connect any one of the gears to its shaft.
- 373 Selective:**  
This subclass is indented under subclass 325. Transmissions wherein there are a plurality of manually operable slidable keys or clutches splined to a single shaft which are connected to each other by constant mesh gears, revoluble on the shafts, the gears being provided with a single key to selectively connect certain of the gears to their respective shafts.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
359, for selective, multiple clutch shaft, slidable key or clutch type interchangeably locked gearing.  
366+, for single key, single clutch shaft, slidable key or clutch type interchangeably locked gearing.
- 374 Multiple key:**  
This subclass is indented under subclass 373. Transmissions, but provided with constantly meshed gears, some of which are loosely mounted on the same shaft and wherein manually operable keys are provided for connecting a selected one of the gears to its shaft.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
362, for progressive, multiple key, single clutch shaft, slidable key or clutch type interchangeably locked gearing.

**375 Spur gears:**

This subclass is indented under subclass 374. Transmissions wherein the gears of the transmission are spur gears.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 359, for selective, multiple clutch shaft, slidable key or clutch type interchangeably locked gearing.
- 363, for progressive transmissions utilizing a single clutch shaft.
- 369+, for spur gear type, single key, single clutch shaft progressive, slidable clutch or key, interchangeably locked gearing.

**376 Single speed forward and reverse:**

This subclass is indented under subclass 325. Miscellaneous transmissions comprising combinations of spur gears with either pulleys and belts or chains and sprockets and provided with manually operable slidable clutches mounted on a single shaft for clutching either the pulleys, the sprockets, or the gears thereto in order to provide either a single forward or a single reverse speed.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclass 21, for reversing, gear controlled clutches.
- 474, Endless Belt Power Transmission Systems or Components, appropriate subclasses for a belt and pulley drive system.

**377 Spur gears:**

This subclass is indented under subclass 376. Transmissions having spur gears in constant mesh, certain of which are rotatable on a shaft and are adapted to be connected to the shaft by manually operated shiftable clutches.

**378 Bevel gears:**

This subclass is indented under subclass 376. Transmissions wherein a bevel driving gear is in constant mesh with a plurality of driven bevel gears, loosely mounted on the driven shaft with a manually operated slidable clutch for connecting either of the loosely mounted gears to its shaft and wherein the drive shaft is at an angle to the driven shaft.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 17, for washer and wringer mechanisms.
- 385+, for pivotally supported bevel gearing.

**379 Bevel and idler gears:**

This subclass is indented under subclass 376. Transmissions wherein a bevel driving gear is in constant mesh with a plurality of driven bevel gears, loosely mounted on the driven shaft with a manually operated slidable clutch for connecting either of the loosely mounted gears to its shaft and wherein the drive and driven shafts are in alignment, and the common bevel gear, which is in mesh with both loose gears, acts as an idler to reverse the drive.

**380 Pivotally supported:**

This subclass is indented under subclass 640. Gearing mounted on a pivotal support to permit the driving and driven gears of a gear train to be pivotally moved relative to each other in a single plane without permitting a change of speed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 17, for washer and wringer mechanisms.
- 353, and 354, for pivoted carriage type interchangeably locked gearing.

SEE OR SEARCH CLASS:

- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses for a coupling between a shaft and a driven member which facilitates relative movement of the shaft with respect to the member.
- 474, Endless Belt Power Transmission Systems or Components, particularly subclasses 58+ for a belt and pulley drive system wherein an output pulley is selectively shiftable to different power output locations relative to an input pulley.

**381 Windmill turntable:**

This subclass is indented under subclass 380. Gearing of the windmill type.

- 383 Screw:**  
This subclass is indented under subclass 380. Screw gearing.
- 384 Spur:**  
This subclass is indented under subclass 380. Spur gearing.
- 385 Bevel:**  
This subclass is indented under subclass 380. Bevel gearing.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
17, for washer and wringer mechanisms.  
378, and 379, for other bevel gearing of the interchangeably locked type.
- 386 Wheel type:**  
This subclass is indented under subclass 385. Bevel gearing associated with the wheels of a vehicle.
- SEE OR SEARCH CLASS:  
180, Motor Vehicles, subclasses 260+ for a motor vehicle having at least one wheel which is both driven and steerable and wherein the steerable wheel is of the stub-axle type and further wherein is included a flexible, axially rotatable means having one portion fixed to the vehicle and another portion pivotable with the steerable wheel for transmitting drive to the wheel, and additionally wherein the pivotable portion of the means includes a gear element of an intermeshing gear type universal joint, which joint may include gears of the bevel type.
- 387 Wringer type:**  
This subclass is indented under subclass 385. Bevel gearing associated with the wringer of a washing machine.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
17, for washer and wringer mechanisms.
- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclass 269, for gearing for wringers.
- 388 Follow-up mechanism:**  
This subclass is indented under subclass 640. Gearing provided with means whereby in response to actuation of one of its elements the movement of such element is continued or augmented by some other means.
- SEE OR SEARCH CLASS:  
91, Motors: Expansible Chamber Type, appropriate subclasses for the combination of an expansible chamber motor operating gearing which is included as part of the power output means of the motor, particularly subclasses 358+ for feedback control mechanisms, many of which include gearing interconnecting the motor control and power output means. For a statement of the line between Classes 74 and 91, see References to Other Classes of the Class 91 definition.  
180, Motor Vehicles, subclasses 6.2+, for gearing organizations enabling steering by driving.
- 390 Eccentric driving shaft and axle:**  
This subclass is indented under subclass 640. Gearing usually for driving a motor vehicle wheel, which is mounted adjacent a wheel and in which the driving shaft is offset with respect to the driven shaft or axle.
- SEE OR SEARCH CLASS:  
180, Motor Vehicles, subclasses 337+, for transmission mechanism combined with vehicle structure.
- 391 Central driving shaft in axle:**  
This subclass is indented under subclass 640. Gearing usually for driving a motor vehicle wheel, which is mounted adjacent a wheel and in which the driving shaft is centrally disposed with respect to the vehicle axle.

## SEE OR SEARCH CLASS:

180, Motor Vehicles, subclasses 70+, for transmission mechanism combined with vehicle structure.

**392 Parallel shafts, adjustable gear mesh:**

This subclass is indented under subclass 640. Gearing in which the gears are carried by parallel shafts which are movable from or toward each other to such a limited extent that the gears always remain in engagement.

## SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, appropriate subclasses for methods of, and apparatus for, feeding material without utilizing the leading or trailing ends to effect movement of the material.

271, Sheet Feeding or Delivering, for front gage rotary conveyors.

**393 Varying speed ratio:**

This subclass is indented under subclass 640. Gearing in which the speed of the driven element is varied during each revolution.

## SEE OR SEARCH CLASS:

475, Planetary Gear Transmission Systems or Components, subclasses 14+ for cyclical or intermittent drive in planetary gearing.

**395 Adjustable:**

This subclass is indented under subclass 640. Gearing in which one of the elements is adjustable relatively to bring it into adjusted relationship with another.

## SEE OR SEARCH CLASS:

73, Measuring and Testing, subclass 507, for a differential speed responsive device.

248, Supports, subclasses 646+, for adjustable supports, for motors, engines, etc., even though disclosed as adjustable for the purpose of engaging two gears.

318, Electricity: Motive Power Systems, subclasses 41+, for electrical synchronizing systems.

352, Optics: Motion Pictures, subclasses 12+ for synchronization of sound and picture in motion picture apparatus; subclass 33 for adjustable mechanical drive between a phonograph and a motion picture device to permit relative position adjustment between the two devices; and subclasses 160+ for adjustable drive connection between the shutter and feed of a motion picture device.

355, Photocopying, subclasses 103 and 108+, for continuous contact film printing.

399, Electrophotography, subclasses 75+ for machine operations of an electrophotography device and subclasses 107+ for particular structure of the device, specifically subclasses 110+ for modular or displaceable components.

**396 Relative movable axes:**

This subclass is indented under subclass 395. Gearing, in which either gear or shaft is adapted to be moved for the purpose of adjustment.

## SEE OR SEARCH CLASS:

248, Supports, subclasses 646+, for adjustable machine supports, per se.

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 101+ for structure wherein a shaft carrying a pulley or guide roll is shiftable such as for increasing belt tension.

476, Friction Gear Transmission Systems or Components, subclass 64 for a friction gear on the shaft of a movably mounted motor.

**397 Parallel shafts:**

This subclass is indented under subclass 396. Gearing, in which the gear shafts are parallel.

## SEE OR SEARCH CLASS:

384, Bearings, subclasses 252+ for a plain bearing with an adjustable support.

**398 Automatic control:**

This subclass is indented under subclass 396. Gearing in which the gears or gear shafts are adjustable by automatic means.

- 399 Parallel shafts:**  
This subclass is indented under subclass 398. Gearing, the gears or gear shafts being parallel to each other.
- 400 Fixed axes:**  
This subclass is indented under subclass 395. Gearing, in which one of the elements is adapted to be moved manually in the direction along its axis for the purpose of adjustment.
- 401 Parallel shafts:**  
This subclass is indented under subclass 400. Gearing, the gear shafts being parallel to each other.
- 402 Automatic control:**  
This subclass is indented under subclass 400. Gearing, gear shafts being adjusted by automatic means.
- 403 Parallel shafts:**  
This subclass is indented under subclass 402. Gearing, the gear shafts being parallel to each other.
- 404 Reversing means:**  
This subclass is indented under subclass 640. Miscellaneous gearing in which the direction of rotation of the driven shaft is reversible and in which there is no change of speed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
360, and 361, for forward and reverse, multiple clutch shaft slidable key or clutch type interchangeably locked gearing.  
376+, for forward and reverse, single clutch shaft, slidable key or clutch type interchangeably locked gearing.
- SEE OR SEARCH CLASS:  
409, Gear Cutting, Milling, or Planing, subclass 336 for a planer reversing mechanism.
- 404.5 Governor control:**  
This subclass is indented under subclass 404. Gearing, in which there is no change of speed, in which the direction of rotation of the driven shaft is reversible, and in which the change of direction is controlled by a governor.
- 405 Disconnecting means:**  
This subclass is indented under subclass 640. Miscellaneous gearing provided with means for disconnecting the gear train.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
336.5, for governor-controlled change-speed gearing.
- 405 Disconnecting means:**  
This subclass is indented under subclass 640. Miscellaneous gearing provided with means for disconnecting the gear train.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
325+, for mechanisms for connecting and disconnecting gears for use in connection with change-speed interchangeably locked transmission gearing.
- SEE OR SEARCH CLASS:  
192, Clutches and Power-Stop Control, appropriate subclasses for clutches, per se.
- 406 Displaceable elements:**  
This subclass is indented under subclass 640. Gearing in which one of the elements moves linearly or angularly about a center other than the axis of rotation of the gear.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
27+, for reciprocating carriage motions.  
31, through 35, for displaceable elements in rack and pinion gearing.  
424.6, for spiral gear driven rack or shaft type gearing.
- SEE OR SEARCH CLASS:  
366, Agitating, subclasses 252+ and 283+ for agitators with a gear driven rotatable stirrer.
- 409 Backlash take-up:**  
This subclass is indented under subclass 640. Gear trains provided with means to eliminate backlash in some element of the combination.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
440+, for backlash takeup for sectional rotary bodies used in gearing.

- SEE OR SEARCH CLASS:  
409, Gear Cutting, Milling, or Planing, subclass 146 for a device for removing backlash or wear from a screw feeding mechanism in a gear cutting machine.
- 410 Pressure distributing:**  
This subclass is indented under subclass 640. Gear trains provided with means by which the pressure of the teeth of one unit is compensated for by that of another unit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
427, for pressure distributing means for worm gearing.
- 411 Yieldability in gear trains:**  
This subclass is indented under subclass 640. Gearing having one element provided with a yielding means through which torque is transmitted.
- SEE OR SEARCH CLASS:  
464, Rotary Shafts Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 51+ for a rotary shaft coupled to driven member via a flexible element.
- 411.5 With brake means for gearing:**  
This subclass is indented under subclass 640. Gearing in which means are provided to selectively stop or prevent rotation of a gearing element.
- SEE OR SEARCH CLASS:  
188, Brakes, appropriate subclasses for brake means, per se.  
192, Clutches and Power-Stop Control, subclasses 215+ for combinations of joint operation and control of transmission and braking mechanisms.
- 412 Directly cooperating gears:**  
This subclass is indented under subclass 640. Gearing consisting of two meshed gears mounted on shafts.
- (1) Note. The mountings and housings for the gears may be included in the claims.
- 413 Parallel axes or shafts:**  
This subclass is indented under subclass 412. Gearing, wherein the gear axes or shafts are parallel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
332, for internal-external interchangeably locked gearing.  
390, for eccentric driving shaft and axle gearing.
- 414 External type:**  
This subclass is indented under subclass 413. Gearing, in which all of the gears have external teeth.
- 415 Pin teeth:**  
This subclass is indented under subclass 414. Gearing, in which one of the gears has pin teeth.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
84, for rotary to intermittent unidirectional mechanical movements.  
351, for interchangeably locked gearing having longitudinally slidable pin gears.  
436, for Geneva gears.
- 416 Intersecting axes:**  
This subclass is indented under subclass 412. Gearing not otherwise classified, consisting of two gears in combination with a particular form of mounting, the axes thereof intersecting each other.
- 417 Bevel gear type:**  
This subclass is indented under subclass 416. Gearing, the gears being of the bevel type.
- 420 Spur and bevel:**  
This subclass is indented under subclass 412. Gearing consisting of a combination of spur and of bevel gears.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
16, for power table and stands.

- 421 Spur:**  
This subclass is indented under subclass 412. Gearing, consisting of gears of the spur type.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
384, for pivotally supported, spur type, interchangeably locked gearing.  
391, for central driving shaft in axle type gearing.  
410, for pressure distributing gearing.
- 422 Rack and pinion:**  
This subclass is indented under subclass 412. Gearing, the gearing embodying racks and pinions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
27+, for reciprocating carriage motions.  
31, through 35, for displaceable elements in rack and pinion gearing.  
406, for displaceable gearing.  
424.5, for spiral gearing.  
842, for rack and pinion mechanisms changing the position of a driven means "on the fly".
- SEE OR SEARCH CLASS:  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 95+, 205, and 230, for rack and pinion drives for the pushing or pulling implements or apparatus.  
409, Gear Cutting, Milling, or Planing, subclass 332 for a rack drive for a planer.
- 423 Bevel:**  
This subclass is indented under subclass 412. Gearing of the bevel type.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
347, for interchangeably locked, longitudinally slidable, multiple, bevel type gearing.  
378, and 379, for interchangeably locked, slidable clutch, single clutch shaft, single speed forward and reverse, bevel type gearing.  
385+, for pivotally supported bevel type gearing.
- SEE OR SEARCH CLASS:  
475, Planetary Gear Transmission Systems or Components, for bevel gears of planetary type.
- 424 Motor vehicle drive:**  
This subclass is indented under subclass 423. Gearing, in which the bevel gearing drives the differential and rear axle shafts of a motor vehicle.
- SEE OR SEARCH CLASS:  
475, Planetary Gear Transmission Systems or Components, subclasses 220+for planetary gear differentials.
- 424.5 Spiral:**  
This subclass is indented under subclass 412. Gearings of the spiral type.
- 424.6 Driven rack or shaft:**  
This subclass is indented under subclass 424.5. Spiral gearing, in which the driven element is a rack or chain.
- 424.7 Screw:**  
This subclass is indented under subclass 424.5. Gearing, the two gears being spiral and nonintersecting.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
425+, for worm gearing.  
458, for worm teeth.
- 424.71 Screw and nut:**  
This subclass is indented under subclass 424.5. Subject matter including gearing including a rotatable element having spiral threads or grooves encircling its axis of rotation and a second element enmeshed with it for relative movement along the axis.
- (1) Note. An arrangement including a shaft and another element rotating relative to each other about a longitudinal axis of the shaft are included even if either or both lack threads as long as they have structure to produce a motion equivalent to a screw and nut through the cooperation of the shaft and other element during rotation. See the search notes below.



- (2) Note. An element having external threads or a collection of elements whose meshing surfaces face outwardly from the collection is considered a screw. An element having internal threads or a collection of elements whose meshing surfaces are inwardly facing relative to the collection is considered a nut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

89.23, for a mechanical movement including a screw and nut for converting motion.

424.73, for a shaft and nut having no defined threads and relying on frictional forces between the nut and shaft to produce the equivalent effect. See (1) Note above.

**424.72 Plural longitudinally variably spaced nuts:**

This subclass is indented under subclass 424.71. Subject matter including a plurality of nuts on the same screw that are moveable to permit the spacing between the nuts to change.

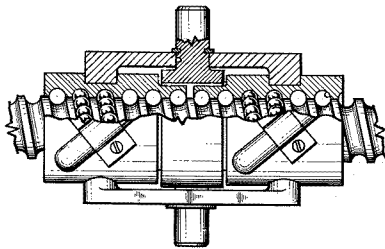


Figure 1. A typical example of the subject matter.

**424.73 Threadless:**

This subclass is indented under subclass 424.71. Subject matter in which the shaft and nut have no threads at the interface between them, i.e., power is transmitted by frictional contact.

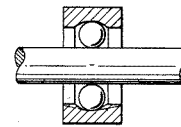


Figure 1. A typical example of the subject matter.

**424.74 Non-linear screw:**

This subclass is indented under subclass 424.71. Subject matter in which a portion of the axis of the screw is curved.

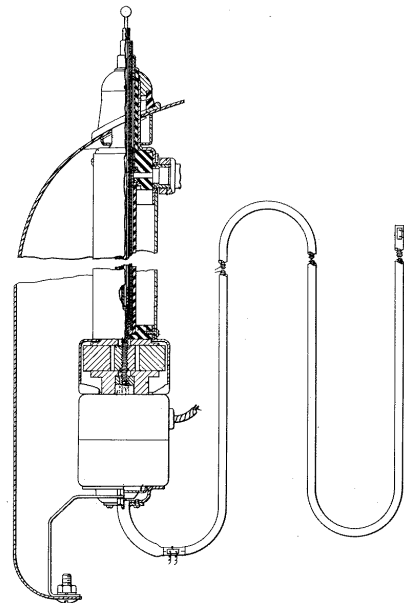


Figure 1. A typical example of the subject matter.

**424.75 Thread geometry:**

This subclass is indented under subclass 424.71. Subject matter including particular structure or shape of the threads.

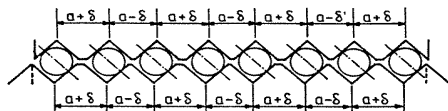


Figure 1. A typical example of the subject matter.

**424.76 Thread pitch varies over axial length:**

This subclass is indented under subclass 424.75. Subject matter in which the distance between successive turns of the helical threads varies from one point on the shaft to another.

**424.77 Shaft thread is spirally wound wire:**

This subclass is indented under subclass 424.75. Subject matter in which the screw thread includes a wire extending along the helix of the thread.

**424.78 Nut disengageable from screw:**

This subclass is indented under subclass 424.71. Subject matter in which the nut is constructed to be readily moved out of contact with the screw.

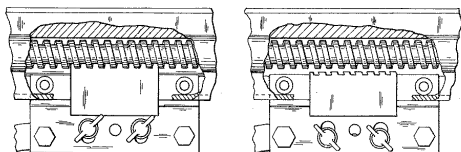


Figure 1. A typical example of the subject matter.

**424.79 Nut segments hinged parallel to shaft (e.g., clam shell-type, etc.):**

This subclass is indented under subclass 424.78. Subject matter in which the nut includes two portions joined together so as to be pivotable relative to each other along an axis that is generally parallel with the axis of relative rotation of the nut and screw when the nut is in operable engagement with the screw.

- (1) Note. The nut portions may be moveable in use or, more typically, only for disassembly.

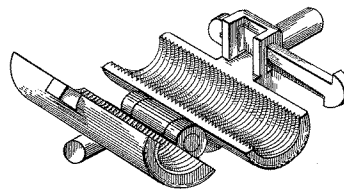


Figure 1. A typical example of the subject matter.

**424.81 Rolling element engaging thread:**

This subclass is indented under subclass 424.71. Subject matter including an element between the screw and nut that engages and rolls in the threads of the screw and nut to effect the meshing of the threads.

**424.82 Recirculating rolling elements:**

This subclass is indented under subclass 424.81. Subject matter including elements between the screw and nut that engage and roll in the threads of the screw and nut to effect the meshing of the threads, the elements traveling along a closed loop path, a portion of which is outside of the screw nut interface and not in meshing force transmitting relationship with the screw and nut.

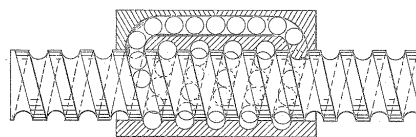


Figure 1. A typical example of the subject matter.

**424.83 Plural independent recirculating element paths:**

This subclass is indented under subclass 424.82. Subject matter including additional elements that roll in the threads of the screw

and nut and travel along a second closed loop path, the paths having substantially no portions in common.

**424.84 Single thread common to plural paths:**

This subclass is indented under subclass 424.82. Subject matter in which portions of each of the two closed loop paths lie in different portions of the same screw or nut thread.

**424.85 Roller return path in shaft:**

This subclass is indented under subclass 424.82. Subject matter in which a portion of the closed loop path is located within the body of the screw.

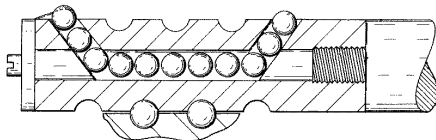


Figure 1. A typical example of the subject matter.

**424.86 Return path geometry:**

This subclass is indented under subclass 424.82. Subject matter including particular structure for guiding the rolling elements along the portion of the path that is not in meshing engagement with the screw and nut threads (i.e., outside the screw nut interface).

**424.87 Rolling element deflector:**

This subclass is indented under subclass 424.86. Subject matter including particular structure for directing the rolling elements between the portions of the paths that lie inside and outside the screw nut interface.

**424.88 Interconnected or cooperating rollers or roller structure:**

This subclass is indented under subclass 424.82. Subject matter in which (1) at least two of the roller elements are connected or cooperate in a manner involving other than mere pushing contact or (2) including the particular shape or construction of an individual roller element.

**424.89 Non-recirculating rolling elements:**

This subclass is indented under subclass 424.81. Subject matter including elements between the screw and nut that engage and roll in the threads of the screw and nut to effect the meshing of the threads, the elements being held in at least one thread at all times during operation.

**424.9 Captured sphere:**

This subclass is indented under subclass 424.89. Subject matter in which the rolling elements are spherical and including means for restricting their movement so as to prevent engagement with one another.

**424.91 Cylindrical or quasi-cylindrical roller element (e.g., inclined roller, etc.):**

This subclass is indented under subclass 424.89. Subject matter in which the rolling elements are substantially cylindrical (i.e., they have a single axis of symmetry about which they roll).

**424.92 Parallel to shaft:**

This subclass is indented under subclass 424.91. Subject matter in which the axes of the rolling elements are substantially parallel to the axis of relative rotation of the screw and nut during operation.

**424.93 Perpendicular to shaft:**

This subclass is indented under subclass 424.91. Subject matter in which the axes of the rolling elements are substantially perpendicular to the axis of relative rotation of the screw and nut (i.e., tangent to a cylinder centered on the axis) during operation.

**424.94 Less than 360 degrees of contact between nut and screw:**

This subclass is indented under subclass 424.71. Subject matter in which the screw and nut engage over an arc that totals substantially less than 360 degrees.

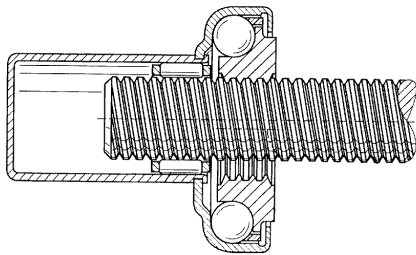


Figure 1. A typical example of the subject matter.

**424.95 Independent nut segments:**

This subclass is indented under subclass 424.94. Subject matter in which the nut includes a plurality of relatively moveable threaded portions each engaging the screw.

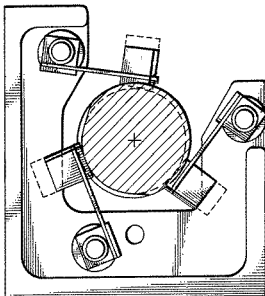


Figure 1. A typical example of the subject matter.

**424.96 Integral deformable tangs engaging screw:**

This subclass is indented under subclass 424.95. Subject matter in which the relatively moveable threaded portions of the nut are integrally connected by means including a flexible member.

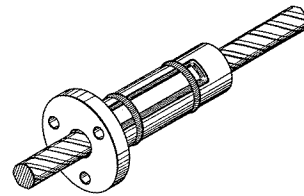


Figure 1. A typical example of the subject matter.

**425 Worm:**

This subclass is indented under subclass 424.5. Gearing of the worm type.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 383, 424.7, 424.71-424.96, 458, and 500, for other screw or worm gearing.
- 396, for gearing having relatively movable axes.
- 411, for yieldability in gear trains.
- 497, for cam type motion translating steering posts.

SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 56.1+, for torque responsive clutches which release on overload.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 220, 229, 296, and 343 for worm and worm wheel gearing operated implements or apparatus.

**425.5 Variable speed:**

This subclass is indented under subclass 425. Gearing, the worm gearing being of a structure to impart a variable speed to the driven member.

**426 Intermittent motion:**

This subclass is indented under subclass 425. Gearing, the worm gearing being of a structure to impart an intermittent motion to the driven element.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 84, for rotary to intermittent unidirectional mechanical movements.  
 436, for Geneva gears.
- 427 Distribution of pressure:**  
 This subclass is indented under subclass 425. Gearing, the pressure of the teeth of one of the elements being compensated for by that of another.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 410, for pressure distributing gearing in general.
- 431 Gear and rotary bodies:**  
 This subclass is indented under subclass 640. Gearing comprising a combination of a gear with a rotary body or bodies, not a gear, fixed thereto and mounted upon a common shaft.
- 432 Laterally-spaced wheels:**  
 This subclass is indented under subclass 431. Gearing, the rotary elements being laterally spaced.
- 433 Radially-spaced wheels:**  
 This subclass is indented under subclass 431. Gearing, the rotary elements being spaced radially.
- 433.5 With flywheel:**  
 This subclass is indented under subclass 431. Subject matter including a motion-smoothing component generally made up of a massive disk-like member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 572.2, for motion smoothing flywheel.
- 434 Rotary bodies:**  
 This subclass is indented under subclass 640. Gearing comprising structure and details of rotary bodies, per se, constituting gearing elements.
- SEE OR SEARCH CLASS:  
 428, Stock Material or Miscellaneous Articles, subclass 550 for composite stock material containing metal particles
- which has porous component, subclass 579 for a metallic intermediate article in the form of a disk.
- 474, Endless Belt Power Transmission Systems or Components,** particularly subclasses 152+ for a positive drive pulley; and subclasses 166+ for a friction drive pulley.
- 435 Mutilated:**  
 This subclass is indented under subclass 434. Inventions, having teeth which extend only partially around the periphery, producing upon rotation an intermittent drive.
- 436 Geneva:**  
 This subclass is indented under subclass 434. Gearing, of the star-wheel type adapted to give intermittent rotation to a driven element during each revolution thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 84, for rotary to intermittent unidirectional mechanical movements.  
 415, for pin toothed external type gearing.
- SEE OR SEARCH CLASS:  
 352, Optics: Motion Pictures, subclass 189 for motion picture sprockets intermittently driven by a star gear.
- 437 Irregular teeth and bodies:**  
 This subclass is indented under subclass 434. Devices, having peripheries of noncircular form or irregularly shaped teeth, or both.
- 438 External and internal teeth:**  
 This subclass is indented under subclass 434. Devices, provided with teeth both on the inner and outer periphery.
- 439 Sectional:**  
 This subclass is indented under subclass 434. Gears, which are made up of a plurality of sections.
- 440 Backlash take-up:**  
 This subclass is indented under subclass 439. Devices, provided with means for the elimination of backlash.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
409, for backlash takeup for gearing in general.
- 441 Screw and nut:**  
This subclass is indented under subclass 440. Devices, the gears being of the screw and nut type.
- 443 Sound deadening:**  
This subclass is indented under subclass 439. Gears including means for deadening sound in operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
445, for multiple disk rotary bodies.
- SEE OR SEARCH CLASS:  
464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 51+ for a flexible connection between a shaft and a member driven by the shaft.
- 444 Differential disks:**  
This subclass is indented under subclass 439. Gears mounted upon a single shaft and connected thereto by means which permits of a differential action between them.
- SEE OR SEARCH CLASS:  
475, Planetary Gear Transmission Systems or Components, subclasses 220+ for planetary gear differentials.
- 445 Multiple disks:**  
This subclass is indented under subclass 439. Devices, made up of laminations.
- SEE OR SEARCH CLASS:  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for laminating processes for making gears.
- 446 Separate rim:**  
This subclass is indented under subclass 439. Bodies, having separate rims and webs.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
448, for bodies having segmental rims.
- 447 Detachable:**  
This subclass is indented under subclass 446. Bodies, having the rim secured to the web by means permitting the detachment of the rim.
- 448 Segmental rim:**  
This subclass is indented under subclass 439. Bodies, having rims made up of a plurality of segments.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
446+, for bodies having separable rims.
- 449 Sheet metal:**  
This subclass is indented under subclass 439. Bodies, fabricated wholly or in part of sheet metal.
- SEE OR SEARCH CLASS:  
301, Land Vehicles: Wheels and Axles, subclasses 5.1+, for wheels.
- 450 Diametrically split:**  
This subclass is indented under subclass 439. Gears, in which the line of division between the sections occurs along a diameter.
- 451 Shaft-admitting insert:**  
This subclass is indented under subclass 439. Gears, provided with removable inserts whereby the shafts may be removed laterally through the opening occurred by the inserts.
- 457 Teeth:**  
This subclass is indented under subclass 640. Subcombinations comprising the gear teeth of meshing gears.
- 458 Worm and helical:**  
This subclass is indented under subclass 457. Devices directed to the structure and details of worm and helical gear teeth.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
424.7, 425+ and 500, for other screw and worm gearing.

- 497, for cam type motion transmitting steering gear.
- 459.5 Bevel:**  
This subclass is indented under subclass 457. Devices comprising bevel teeth.
- 460 Spur:**  
This subclass is indented under subclass 457. Devices comprising spur teeth.
- 461 Yieldable:**  
This subclass is indented under subclass 460. Devices wherein the spur teeth are combined with yieldable elements.
- 462 Form:**  
This subclass is indented under subclass 460. Devices wherein the spur teeth are of a modified tooth form.
- 464 Antifriction:**  
This subclass is indented under subclass 462. Devices, in which the teeth embody antifriction means.
- 465 Roller:**  
This subclass is indented under subclass 464. Devices, in which the teeth are provided with or operate against rollers.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
497, for cam type, motion transmitting steering gear.  
500, for worm type, motion transmitting steering gear.
- 466 Twisted:**  
This subclass is indented under subclass 462. Devices, in which the teeth are twisted.
- 467 Lubrication:**  
This subclass is indented under subclass 640. Gears specifically modified for purposes of lubrication.
- SEE OR SEARCH CLASS:  
184, Lubrication, subclasses 6+, for lubricating systems and particularly subclasses 11.1+ for splash systems.
- 475, Planetary Gear Transmission Systems or Components, subclasses 159+ for lubrication associated with planetary gear transmission.
- 468 Teeth:**  
This subclass is indented under subclass 467. Gearing having teeth specifically modified for purposes of lubrication.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2, 3, and 4, for automatic operation of control.
- 469 CONTROL LEVER AND LINKAGE SYSTEMS:**  
This subclass is indented under the class definition. Mechanisms which are made up of (1) such links as cranks, levers and rods, with turning and sliding pairs, and (2) links consisting of bodies which have two or more rigid elements, which links may be connected to other bodies for the purpose of transmitting force or motion, not otherwise classified.
- (1) Note. By pairs is meant two rigid bodies movably connected together so that the relative motion between them is of a definite character.
- (2) Note. Such linkages are normally manually operated and used for controlling some device.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
20, through 169, for mechanical movements.
- SEE OR SEARCH CLASS:  
901, Robots, subcollections 27+ for lever and linkage systems which make up a robot arm.
- 470 Resilient connections:**  
This subclass is indented under subclass 469. Systems which have a resilient member as one of the elements.

**471 Multiple controlled elements:**

This subclass is indented under subclass 469. Systems in which there is a single control element which selectively operates a plurality of controlled elements.

SEE OR SEARCH THIS CLASS, SUBCLASS:

480, for interconnected multiple controlling systems.

SEE OR SEARCH CLASS:

477, Interrelated Power Delivery Controls, Including Engine Control, for an element to control both a transmission and an engine.

**473.1 Transmission control:**

This subclass is indented under subclass 471. Multiple controlled elements for manually controlling an assembly of gears or associated parts for the transfer of power from a prime mover to a driving or propelling means.

(1) Note. When the control system is claimed in combination with the transmission, the patent is classified with the transmission. See the appropriate transmission class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

25+, for mechanical movements for converting rotary motion to or from reciprocating or oscillating motion.

334, for preselector type combined clutch and gear, interchangeably locked gearing.

337.5, for a cam-operated transmission control.

365, for an electrical transmission control system.

470, for resilient joints in a lever system.

SEE OR SEARCH CLASS:

477, Interrelated Power Delivery Controls, Including Engine Control, subclasses 34+ for transmission control and 125+ for a means to prohibit the changing of the speed ratio of the gear transmission when such change may harm the engine or gear transmission.

701, Data Processing: Vehicles, Navigation, and Relative Location, subclasses 51 through 66 for a computer controlled transmission.

**473.11 Fluid actuator:**

This subclass is indented under subclass 473.1. Transmission control wherein the operation or engagement of a multiple controlled transmission element is initialized by a fluid means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

346, for longitudinally slidable gearing containing a plurality of slidable spur gears which are adapted to be shifted into and out of engagement by fluid pressure means under manual control.

364, for a clutch or key shifted by manually controlled fluid operated means, or a fluid-type clutch.

655, for a fluid drive mechanism included as part of an intermediate internal mechanism of a single gearing unit.

718, for a fluid drive in which alternate plural power paths to or from a gearing assembly is divided or combined.

730.1+, for gearing combined with a fluid force torque transmitting device to form a drive train.

SEE OR SEARCH CLASS:

477, Interrelated Power Delivery Controls, Including Engine Control, subclasses 52+ for the combination of a hydraulic or pneumatic torque transmitting means and a gear transmission, interrelated with control of the engine.

**473.12 Electrical actuator:**

This subclass is indented under subclass 473.1. Transmission control wherein the operation or engagement of a multiple controlled transmission element is initialized by an electrical pulse or current.

**473.13 Occupant propelled vehicle:**

This subclass is indented under subclass 473.1. Transmission control wherein the multiple controlled transmission elements are in a vehicle moved via the action of a rider or occupant of the vehicle.



## SEE OR SEARCH CLASS:

- 280, Land Vehicles, subclasses 7.15+, 12.1+, 200+, and 828+ for a vehicle having a means to be propelled by the occupant.
- 482, Exercise Devices, subclasses 66+ for an occupant propelled support frame having movement facilitating feature for foot travel.

**473.14 Transmission controlled by flexible cable:**

This subclass is indented under subclass 473.13. Occupant propelled vehicle wherein the multiple controlled transmission elements are manipulated or moved by a pliable cable.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 500.5, for an elongated element for transmitting force or motion from a hand to operate a device, wherein the element is formed of a flexible or pliant material or a series of pivoted links, such that the force or motion may be transmitted along a curved path.

**473.15 Transmission controlled by flexible cable:**

This subclass is indented under subclass 473.1. Transmission control wherein the multiple controlled transmission elements are actuated by a pliable cable.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 500.5, for an elongated element for transmitting force or motion from a hand to operate a device, wherein the element is formed of a flexible or pliant material or a series of pivoted links, such that the force or motion may be transmitted along a curved path.

**473.16 Foot operated:**

This subclass is indented under subclass 473.1. Transmission control wherein the multiple controlled element is engaged or disengaged via movement of a lever engaged by the terminal part of a human leg.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 478+, for foot operated controls which selectively operate a plurality of controlled members.
- 481+, for an independently operable system which may be connected and operated by a single controlling member having a foot operated control and a hand operated control.
- 512+, for foot operated links connected to other bodies for the purpose of transmitting force or motion.

## SEE OR SEARCH CLASS:

- 477, Interrelated Power Delivery Controls, Including Engine Control, subclasses 210+ for a foot operated control of an interrelated engine and brake regulating means.

**473.17 Multiple foot-operated controls:**

This subclass is indented under subclass 473.16. Foot operated control having a plurality of independent foot operated levers.

**473.18 Control convertible between automatic and manual operation:**

This subclass is indented under subclass 473.1. Transmission control capable of selectively operating in a system controlled mode or an operator manipulated mode.

**473.19 Control of plural mechanisms (e.g., control of transmission and control of 4 - wheel drive):**

This subclass is indented under subclass 473.1. Transmission control capable of operating more than one transmission or related mechanism.

**473.2 Separate control levers:**

This subclass is indented under subclass 473.19. Control of plural mechanisms having individual controls for each controlled transmission or mechanism.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 519+, for control levers.

**473.21 Restriction of shift, gear selection, or gear engagement:**

This subclass is indented under subclass 473.1. Transmission control wherein movement of a shifting element is regulated, limited, or prohibited.

SEE OR SEARCH THIS CLASS, SUBCLASS:

325, in which a plurality of speeds are transmitted from one shaft to another by optionally engaging or meshing selected gears or clutches or gears and clutches, to their supporting shafts.

SEE OR SEARCH CLASS:

477, Interrelated Power Delivery Controls, Including Engine Control, subclasses 51+ wherein fluid resistance inhibits rotation of a planetary transmission element and 125+ for the prevention of an unsafe or unintentional shift.

**473.22 Prevention of reverse shift:**

This subclass is indented under subclass 473.21. Restricted shift, gear selection or gear engagement wherein a reverse shift, selection, or engagement is averted, impeded, or prohibited.

SEE OR SEARCH CLASS:

477, Interrelated Power Delivery Controls, Including Engine Control, subclasses 126+ for the prevention of an unsafe or unintentional reverse shift.

**473.23 Separate actuator to disengage restrictor:**

This subclass is indented under subclass 473.21. Restricted shift, gear selection or gear engagement further comprising a releasable mechanism for manually enabling the shifting, selecting, or engaging element.

**473.24 Shift element interlock:**

This subclass is indented under subclass 473.21. Restricted shift, gear selection or gear engagement wherein the shifting elements are releasably interconnected.

**473.25 With detent, recess, notch, or groove:**

This subclass is indented under subclass 473.24. Shift rod interlock wherein the interlock comprises a stop or checking device to

hold the shifting element in a predetermined position until moved therefrom by an application of a force transmitted to the element.

**473.26 Resiliently biased interlock:**

This subclass is indented under subclass 473.24. Shift rod interlock wherein the interlock is flexibly urged in a locking position.

**473.27 Spherical restrictor:**

This subclass is indented under subclass 473.21. Restricted shift, gear selection, or gear engagement wherein the restrictor is generally round in three dimensional space.

**473.28 Resiliently biased restrictor:**

This subclass is indented under subclass 473.21. Restricted shift, gear selection, or gear engagement wherein the restrictor is flexibly urged in a locking position.

**473.29 Having vibration damper:**

This subclass is indented under subclass 473.1. Transmission control having a means to shunt frequencies generated by the transmission.

**473.3 Manually operated selector (e.g., remotely controlled device, lever, push button, rotary dial, etc.):**

This subclass is indented under subclass 473.1. Transmission control wherein the transmission is manipulated by the vehicle or machine operator using a hand operated device.

**473.31 Control lever on steering column:**

This subclass is indented under subclass 473.3. Manually operated selector located on the steering column of a vehicle.

**473.32 Control lever movable through plural planes:**

This subclass is indented under subclass 473.31. Steering column mounted control level wherein the control lever movement is not confined to a single plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:

471, a single control element which selectively operates a plurality of controlled elements.

**473.33 Control lever movable through plural planes:**

This subclass is indented under subclass 473.3. Hand operated selector wherein the control lever movement is not confined to a single plane.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471, a single control element which selectively operates a plurality of controlled elements.

**473.34 Spherical mount (e.g., ball and socket):**

This subclass is indented under subclass 473.33. Control lever movable through plural planes wherein the control lever is mounted using a spherical portion and complementary cavity mount.

**473.35 Resiliently biased control lever:**

This subclass is indented under subclass 473.34. Spherical mounted control lever wherein the control lever is resiliently biased or urged in a particular orientation.

**473.36 Particular element (e.g., shift fork, template, etc.):**

This subclass is indented under subclass 473.1. Transmission control having specific structure of a transmission control element or related mechanism.

**473.37 Shift fork structure:**

This subclass is indented under subclass 473.36. Particular element wherein the transmission control element or related mechanism is a shift fork.

**478 Foot operated:**

This subclass is indented under subclass 471. Systems in which there are foot operated controls which selectively operates a plurality of controlled members.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

473.16+, for foot operated transmission controls.

480, for interconnected multiple control elements.

523, for hand control levers.

**478.5 Offset extension:**

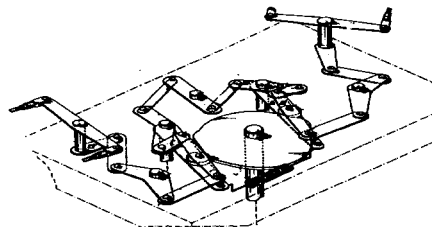
This subclass is indented under subclass 478. Devices wherein there are at least two foot operated controllers for separate systems, and one of the controllers has either an extension or a remote operator attached or connected thereto and so positioned with respect to at least one other of the controllers that a single foot may be manipulated to effect operation of at least two of the controllers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

480, for devices wherein there are a plurality of systems respectively having controllers, which controllers are provided with a mechanical interconnection.

**479.01 Multiple controlling elements for single controlled element:**

This subclass is indented under subclass 469. Systems in which there are a plurality of controlling elements providing input to control a single element output.

**480 Interconnected:**

This subclass is indented under subclass 479. Systems in which there are a plurality of independently operable systems which may be connected and operated by a single controlling member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

473.16+, for foot operated transmission controls.

494, for combined steering posts with auxiliary operators thereon.

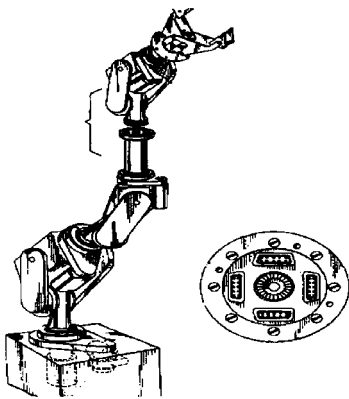
562+, for pedals having additional foot engaging portions.

- 481 Hand and foot:**  
This subclass is indented under subclass 480. Systems, when one control is a foot operated member and the other a hand operated member.
- SEE OR SEARCH CLASS:  
188, Brakes, subclass 106, for brakes which are operated by both hand and foot controls.
- 482 Accelerator:**  
This subclass is indented under subclass 481. Systems, for controlling a carburetor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
513, for foot operated accelerators, per se.
- 483 Interlocked:**  
This subclass is indented under subclass 479. Systems located between and cooperating with elements of a plurality of control lever and linkage systems which prevent the simultaneous operation of the control systems, and permit the operation of only one control system at a time.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
473.24+, for interlocked multiple controlled elements.
- SEE OR SEARCH CLASS:  
246, Railway Switches and Signals, subclasses 131+, for interlocking switches and signals.
- 484 Steering and controls assemblies:**  
This subclass is indented under subclass 479. Systems where the controlling elements are grouped around a steering post.
- 485 Rotary control shaft:**  
This subclass is indented under subclass 484. Systems in which the control members are rotary shafts.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
504, for manually operated rotatable rod, shaft or post type controls.
- 486 Reciprocating control elements:**  
This subclass is indented under subclass 484. Systems in which the controlling elements have a part reciprocating in a line parallel to the steering post axis.
- 487 Flexible:**  
This subclass is indented under subclass 486. Systems in which the reciprocating member is flexible.
- 488 Handle bar type:**  
This subclass is indented under subclass 486. Systems in which the rotary shafts are grouped about a handle bar and in which one of the shafts reciprocates.
- 489 Flexible control element:**  
This subclass is indented under subclass 488. Systems in which one element of the controls is a flexible member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
501+, for Bowden wires.
- SEE OR SEARCH CLASS:  
464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 51+ for a flexible shaft; and subclasses 173+ for a flexible housing for a shaft or Bowden cable.
- 490 Antirattling elements:**  
This subclass is indented under subclass 479. Systems in which a plurality of controlling elements are grouped about each other, and a device is interposed between the controlling elements to prevent rattling.
- SEE OR SEARCH CLASS:  
238, Railways: Surface Track, subclass 382, for noise deadening surface track.  
248, Supports, subclasses 556, 557, 560+, and 638 for vibration damping supports.  
278, Land Vehicles: Animals Draft Appliances, subclasses 61+, for anti-rattling thill couplings.  
280, Land Vehicles, subclasses 89+ for an occupant steered vehicle including

means for inhibiting or prohibiting unintended variant steering operation known as “wheel shimmy or wobble”; subclass 108 for a draft coupling or tongue antivibrator in a land vehicle of general utility; subclass 137.507 for an antirattler of a fifth wheel; or subclass 780 for an occupant steered vehicle steering arrangement including a pliant or resilient means interposed between a steering post or column and the vehicle structure.

#### 490.01 Robotic arm:

This subclass is indented under subclass 479.01. Systems in which the controlled element is a member of a robotic linkage system which may include a base and its associated supporting structure.



- (1) Note. The definitions for various terms relating to “robots” in this subclass definition and in the definitions for those subclasses which are either coordinate or subordinate to this subclass are as set forth in the glossary of Class 901, Robots.
- (2) Note. Robotic linkage systems having a claimed specific end effector and details thereof are not provided for in this class (74); see search notes below.

#### SEE OR SEARCH CLASS:

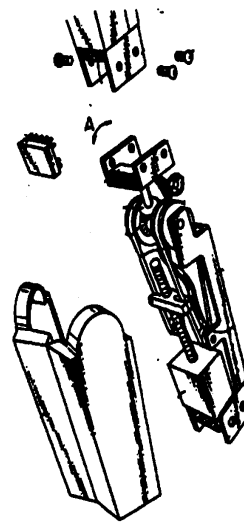
- 414, Material or Article Handling, appropriate subclasses for robot linkage systems having a positively claimed end effector which can manipulate or

move an article or a quantity of material.

- 901, Robots, for cross reference art collections regarding various robotic features.

#### 490.02 Including power cable or connector:

This subclass is indented under subclass 490.01. Subject matter in which the controlled member has associated therewith an electrical cable, a pneumatic tube, a hydraulic conduit, or a connector which will handle either single or plural energy paths.

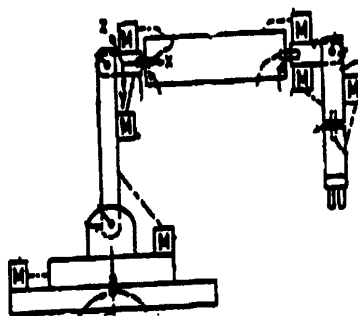


#### SEE OR SEARCH CLASS:

- 174, Electricity: Conductors and Insulators, appropriate subclasses for various cable structures and for various insulators or isolators.
- 439, Electrical Connectors, appropriate subclasses, for connectors between electrical conductors.

#### 490.03 Including electric motor:

This subclass is indented under subclass 490.01. Subject matter in which one or more electric motors are used to move a robotic linkage system to a desired location within the range of motion of the linkage.



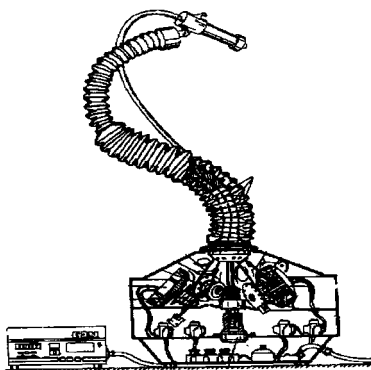
- (1) Note. The electric motors in this subclass are used to move the links of a robotic linkage system only; they are not intended to be used in translating a base member.

SEE OR SEARCH CLASS:

- 310, Electrical Generator or Motor Structure, appropriate subclasses for various motor structure.
- 318, Electricity: Motive Power Systems, subclasses 415+ for automatic motor controls.
- 901, Robots, subclasses 23 and 24 for electric motor drive systems for arms with end effectors.

**490.04 Including flaccid drive element:**

This subclass is indented under subclass 490.01. Subject matter in which the robotic linkage system is moveable to a desired location by drive inputs from one or more nonrigid flexible elements.



- (1) Note. Flaccid drive elements include, but are not limited to belts, chains, cables, or solid strands (e.g., bowden wire).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

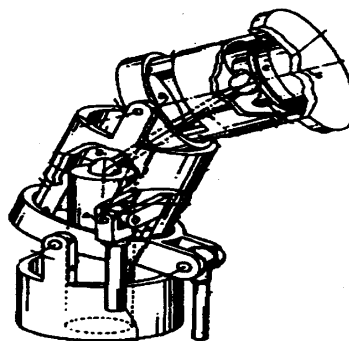
- 89.2+, for reciprocating or oscillating to or from alternating rotary including flexible drive connector (e.g., belt, chain, strand).

SEE OR SEARCH CLASS:

- 901, Robots, subclass 21 for a robot arm with a flaccid drive element.

**490.05 Joint between elements:**

This subclass is indented under subclass 490.01. Subject matter in which the controlled member is a drive path connection between two or more members of a robot linkage.

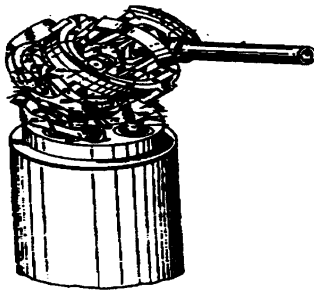


SEE OR SEARCH CLASS:

- 623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclasses 57+ for arm components and connections therebetween.
- 901, Robots, subclass 28 for joints in robot linkages.

**490.06 Wrist:**

This subclass is indented under subclass 490.05. Subject matter in which the joint, typically between the robot linkage and the end effector mount member, permits rotation about a plurality of orthogonal axes.



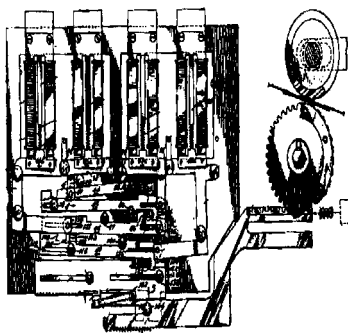
- (1) Note. See Class 901 glossary for a definition of "wrist".

**SEE OR SEARCH CLASS:**

- 623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclasses 61+ for artificial wrists.  
901, Robots, subclass 29 for robot wrists.

**490.07 Power elements as controlling elements:**

This subclass is indented under subclass 479.01. Subject matter in which the controlling elements include power devices which include, but are not limited to electric motors, fluid motors, spring motors, heat engines (e.g., thermostatic actuator), electromagnetic devices (e.g., solenoids), etc.



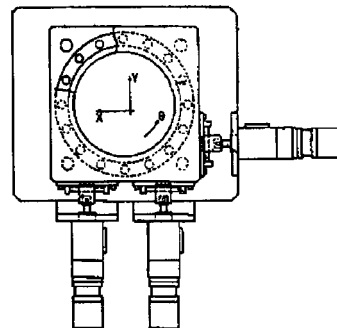
**SEE OR SEARCH CLASS:**

- 60, Power Plants, appropriate subclasses for related prime movers.  
91, Motors: Expansible Chamber Type, appropriate subclasses for fluid motor detail.

- 92, Expansible Chamber Devices, appropriate subclasses for fluid actuators.  
185, Motors: Spring, Weight, or Animal Powered, appropriate subclasses for spring escapements or spring motors.  
310, Electrical Generator or Motor Structure, appropriate subclasses for various motor structures and subclasses 311+ for piezoelectric devices.  
335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, appropriate subclasses for electromagnetic devices.

**490.08 Planar surface with orthogonal movement and rotation:**

This subclass is indented under subclass 490.07. Subject matter in which the power elements control both linear movement of a planar surface member (constrained to move along at least one of the three orthogonal spacial axes) and its rotary movement about at least one axis.



- (1) Note. This subclass provides a locus for rotary tables which have power inputs to control both translation and rotation.

**SEE OR SEARCH CLASS:**

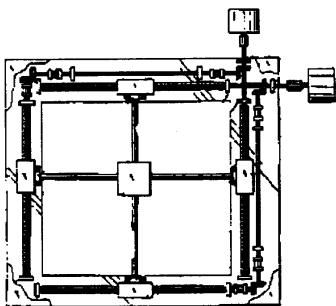
- 33, Geometrical Instruments, subclass 1, for x-y motion.  
108, Horizontally Supported Planar Surfaces, subclasses 20, 137, and 143 for horizontally adjustable planar surfaces.  
248, Supports, subclasses 184, 657, and 661 for adjustable supports.  
269, Work Holders, subclasses 71 and 73 for work holders with adjustment means to shift the workpiece location on a machine tool.

359, Optical: Systems and Elements, subclass 393 for microscope stage or slide carrier with plural transverse movement.

414, Material or Article Handling, subclass 749.1 for horizontal linear movement.

**490.09 Planar surface with orthogonal movement only:**

This subclass is indented under subclass 490.07. Subject matter in which the power elements control linear movement of a planar surface member that is constrained to move along at least one of the three orthogonal spatial axes.



- (1) Note. This subclass provides a locus for x-y tables which have power inputs to control translation only.

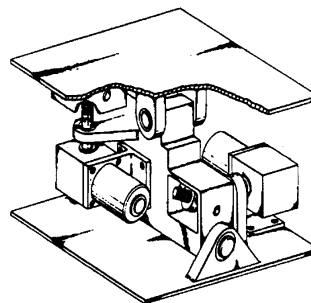
**SEE OR SEARCH CLASS:**

- 33, Geometrical Instruments, subclass 1 M, for x-y motion.
- 108, Horizontally Supported Planar Surfaces, subclasses 20, 137, and 143 for horizontally adjustable planar surfaces.
- 248, Supports, subclasses 184, 657, and 661 for adjustable supports.
- 269, Work Holders, subclasses 71 and 73 for work holders with adjustment means to shift the workpiece location on a machine tool.
- 359, Optical: Systems and Elements, subclass 393 for microscope stage or slide carrier with plural transverse movement.

414, Material or Article Handling, subclass 749 for horizontal linear movement.

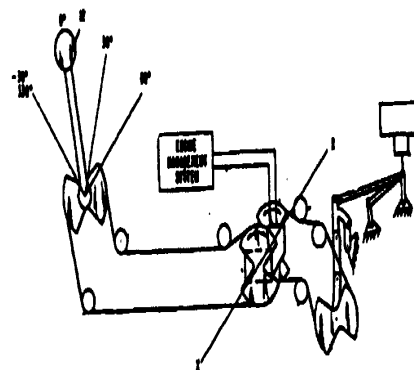
**490.1 Pair of power elements:**

This subclass is indented under subclass 490.07. Subject matter in which there are only two power elements in the linkage system.



**490.11 Power and manual controlling elements:**

This subclass is indented under subclass 479.01. Subject matter in which there is a combination of at least one power driven element and at least one manually operated element which together control the system's single output element.



- (1) Note. In this subclass, and in coordinate and subordinate subclasses, the terms "manual" and "hand operated" also include using leg or foot power.

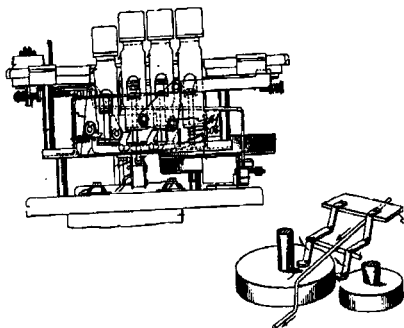
**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 625, for devices having alternate manual or power operators to control an output.



**490.12 Manual controlling elements:**

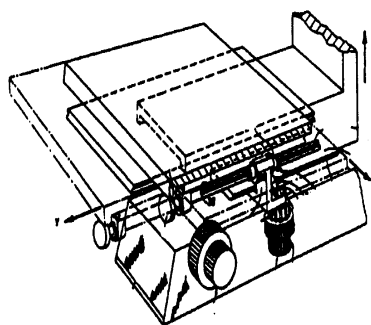
This subclass is indented under subclass 479.01. Subject matter in which there is a plurality of exclusively hand or exclusively foot operated devices which together provide inputs to control the system's single output element.



- (1) Note. In this subclass, manual elements include, but are not limited to such devices as push buttons, levers, hand-wheels, foot pedals, etc.
- (2) Note. In this subclass, and in coordinate and subordinate subclasses, the terms "manual" and "hand operated" also includes using leg or foot power.

**490.13 Planar surface with orthogonal movement or rotation:**

This subclass is indented under subclass 490.12. Subject matter in which hand operated elements control both linear movement of a planar surface member (constrained to move along at least one of the three orthogonal spatial axes) or its rotary movement about at least one axis.



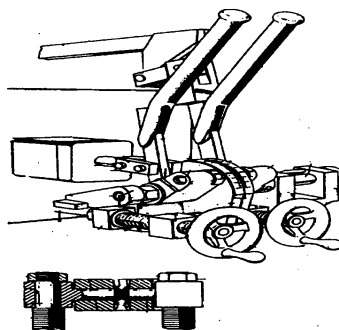
- (1) Note. This subclass provides a locus for rotary tables which have only manual inputs to control translation or rotation.

**SEE OR SEARCH CLASS:**

- 33, Geometrical Instruments, subclass 1 M, for x-y motion.
- 108, Horizontally Supported Planar Surfaces, subclasses 20, 137, and 143 for horizontally adjustable planar surfaces.
- 248, Supports, subclasses 184, 657, and 661 for adjustable supports.
- 269, Work Holders, subclasses 71 and 73 for work holders with adjustment means to shift the workpiece location on a machine tool.
- 359, Optical: Systems and Elements, subclass 393 for microscope stage or slide carrier with plural transverse movement.
- 414, Material or Article Handling, subclass 749 for horizontal linear movement.

**490.14 Levers:**

This subclass is indented under subclass 490.12. Subject matter in which the manual controlling elements are a plurality of first, second, or third degree levers which are either operated by hand or by foot.



- (1) Note. In this subclass, levers include, but are not limited to such devices as hand-wheels, foot pedals, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

481, for the combination of a hand operated lever and a foot operated pedal.

**490.15 Pair of levers:**

This subclass is indented under subclass 490.14. Subject matter in which there are only two control elements in the linkage system that are exclusively either hand or foot operated.

- (1) Note. In this subclass, levers include, but are not limited to such devices as hand-wheels, foot pedals, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

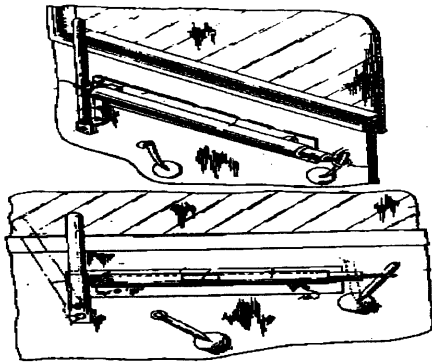
481, for the combination of a hand operated lever and a foot operated pedal.

**491 Hand operated:**

This subclass is indented under subclass 469. Systems which are hand operated.

**492 Steering posts:**

This subclass is indented under subclass 491. Hand operated steering posts.



SEE OR SEARCH CLASS:

180, Motor Vehicles, subclasses 78 and 400+ for steering posts combined with vehicle structure.

**493 Adjustable:**

This subclass is indented under subclass 492. Hand operated steering posts which are angularly or axially adjustable.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

485, for steering posts, per se.

**494 Auxiliary operators:**

This subclass is indented under subclass 492. Auxiliary devices to be used alternately with the conventional steering wheel or arm for operating steering posts.

**495 Position controllers:**

This subclass is indented under subclass 492. Devices acting on a steering post or wheel to position it in a selected position.

- (1) Note. In this subclass the steering post is positioned, as distinguished from being positively locked, which latter feature is covered by the locks in Class 70, Locks, subclasses 182+.

SEE OR SEARCH CLASS:

70, Locks, subclasses 182+ for a lock for a rotary shaft (e.g., a steering post); subclasses 207+ for a lock for a handle, a handwheel (e.g., a steering wheel), or a knob; and subclass 252 for a lock for an automobile steering mechanism, and wherein the mechanism includes a switch.

192, Clutches and Power-Stop Control, subclass 219, for drive release locking clutches.

280, Land Vehicles, subclass 89.11 for a general utility land vehicle including occupant controlled steering of laterally opposed, stub axle supported, steerable road wheels provided with means for returning the steerable road wheels to a center or neutral angulation which may or may not be fluid operated; subclass 89.13 for a fluid positioning device employed in conjunction with the tie rod interconnecting laterally opposed steerable stub axles not returning the steerable road wheels to a center or neutral angulation; or subclass 90 for a general utility land vehicle including occupant controlled steering having fluid positioning devices not limited to laterally opposed, stub axle supported, steerable road wheels.

- 496 Motion translating mechanism:**  
This subclass is indented under subclass 492. Devices for transferring power from steering posts to steering linkage.
- SEE OR SEARCH CLASS:  
180, Motor Vehicles, subclasses 400+, for power-operated steering mechanisms.
- 497 Cam type:**  
This subclass is indented under subclass 496. Mechanisms in which cams are used for transferring power from the steering posts to the steering linkage.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
56+, for mechanical movements of the rotary to or from reciprocating or oscillating type having an axial cam and slide.  
74, for mechanical movements of the rotary to alternating rotary type having mutilated gearing connections.
- 498 Gear type:**  
This subclass is indented under subclass 496. Mechanisms in which gears are used for transferring power from steering posts to steering linkages.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
485, for combined steering and control assemblies.  
640+, for gearing, per se.
- 499 Screw and nut:**  
This subclass is indented under subclass 498. Mechanisms in which screw and nut gearing is used.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
424.71 through 424.96, for screw and nut gearing, per se.
- 500 Worm:**  
This subclass is indented under subclass 498. Mechanisms in which worm gearing is used.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
425+, for worm gearing, per se.
- 500.5 Flexible transmitter (e.g., bowden cable):**  
This subclass is indented under subclass 491. Mechanism including an elongated element for transmitting force or motion from a hand to operate a device, wherein the element is formed of a flexible or pilant material or a series of pivoted links, such that the force or motion may be transmitted along a curved path.
- SEE OR SEARCH CLASS:  
4, Baths, Closets, Sinks, and Spittoons, subclass 412 for a flexible linkage actuator for a float-type flush valve.  
73, Measuring and Testing, subclasses 318 and 321 for flexible transmission elements combined with liquid level gauges and uses to transmit motion from a float to a gauge.  
100, Presses, subclasses 267 and 278+ for presses which employ a flexible element actuator.  
138, Pipes and Tubular Conduits, subclasses 118+ for a flexible pipe.  
160, Flexible or Portable Closure, Partition, or Panel, subclasses 344+ for cable-operators for curtains or drapes.  
172, Earth Working, subclasses 414, 502 and 829 for earth working apparatus which employs a flexible cable actuator (e.g., for raising or lowering a bulldozer blade).  
212, Traversing Hoists, subclasses 239 through 241 and 262-263 for cable actuated crane booms.  
244, Aeronautics and Astronautics, subclass 232 for a pilot operated cable and linkage control system.  
251, Valves and Valve Actuation, subclass 294 for a flexible cable valve actuator.  
254, Implements or Apparatus for Applying a Pushing or Pulling Force, particularly subclasses 264+ for cable actuators for load hauling or hoisting devices.  
446, Amusement Devices: Toys, subclasses 31+ for tethered toy aircraft having cable operated mechanisms.

464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 51+ for a flexible torque transmitting element.

### 501.5 **Constant tension sustaining:**

This subclass is indented under subclass 500.5. Devices comprising means for maintaining an established static stretch or pull in the flexible elements, effective upon change in said stretch or pull, for concurrently restoring the same to the established value.

- (1) Note. Many of these devices correct the change in tension resulting from a change in elongation of either the flexible element and/or the system mounting, due to variations in temperature.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

586, for longitudinally adjustable piston rods.

SEE OR SEARCH CLASS:

- 246, Railway Switches and Signals, subclasses 152+, for constant tension sustaining mechanism disclosed for use in interlocking, manually actuated, mechanically locking, railway switches and signals.
- 267, Spring Devices, appropriate subclasses, for spring devices, per se.
- 474, Endless Belt Power Transmission Systems or Components, particularly subclasses 101+ for a belt tightener.

### 501.6 **And hand operator:**

This subclass is indented under subclass 500.5. Mechanism including a particular input portion which is directly contacted and manipulated by the hand.

SEE OR SEARCH CLASS:

446, Amusement Devices: Toys, subclasses 31+ for a (cable) control handle for a tethered toy aircraft.

### 502 **Slidable:**

This subclass is indented under subclass 501.6. Device wherein the particular input portion which is directly contacted and manipulated by the hand comprises a reciprocating rod slidably engaged in fixed support structure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

487, for hand operators for reciprocating flexible elements combined with post structure.

### 502.1 **For moving a mirror:**

This subclass is indented under subclass 501.6. Mechanism wherein the elongated flexible element is connected to a device having a polished or smoothed surface that forms an image by reflection, and is intended to transmit motion from a hand to the device.

### 502.2 **Single rotatable lever (e.g., for bicycle brake or derailleur):**

This subclass is indented under subclass 501.6. Mechanism wherein the particular input portion comprises a pivoted link or bar having a first section adapted to be contacted and moved by the hand, and a second portion connected directly to the flexible element or an intermediate fastener.

- (1) Note. Mechanism which employ serially connected levers at the input to the flexible element are excluded.

SEE OR SEARCH CLASS:

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 243+ for a hand lever for tensioning flexible material (e.g., cable).

### 502.3 **Including rolling antifriction elements:**

This subclass is indented under subclass 500.5. Mechanism including a plurality of discrete rotatable elements located between and contacting the flexible element and its surrounding or supporting structure, to eliminate frictional contact between the two.

SEE OR SEARCH CLASS:

160, Flexible or Portable Closure, Partition, or Panel, subclasses 346 and 347 for cable antifriction means employed with drape or curtain operators.

### 502.4 **And sheath support, connector, or anchor:**

This subclass is indented under subclass 500.5. Mechanism including a flexible tubular housing covering a substantial length of the flexible element and which allows axial movement of

the element therein, wherein one of the following is provided: (a) means to hold up or provide a foundation for the flexible housing or (b) means to fasten an end of the flexible housing either to another section of flexible housing or to a structure which is fixed with respect to the flexible element.

SEE OR SEARCH CLASS:

248, Supports, subclasses 65+ for a sheath support bracket, per se.

#### 502.5 **Specific cable or sheath structure:**

This subclass is indented under subclass 500.5. Mechanism wherein significance is attributed to the particular composition or form of either the elongated flexible element or a flexible tubular housing which covers a substantial length of the flexible element and allows axial movement of the element therein.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 36 for conduit or tube type stock material and subclass 377 for a sheath having a wound or wrapped core or coating.

464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclass 173 for flexible shaft housings.

#### 502.6 **Specific cable connector or guide:**

This subclass is indented under subclass 500.5. Mechanism wherein particular significance is attributed to either (a) a device or structure for fastening an end of the flexible element to something, or (b) a rigid element which defines a path through which the flexible element moves and which limits lateral movement of the flexible element.

SEE OR SEARCH CLASS:

24, Buckles, Buttons and Clasps, etc., subclasses 115+ for means to fasten a cable or cord to something other than a cable or cord.

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 389 for cable guides.

403, Joints and Connections, appropriate subclasses for a cable connector, per se.

439, Electrical Connectors, appropriate subclasses for devices adapted to electrically connect two wires.

#### 503 **Sliding rod:**

This subclass is indented under subclass 491. Devices comprising hand operated, rigid, control members which operate by sliding movement in the direction of their longitudinal axes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

502, for slidable operators for flexible transmitters.

#### 504 **Rotatable rod, shaft, or post:**

This subclass is indented under subclass 491. Devices, comprising miscellaneous hand operated controls which consist of a rigid rotatable member.

#### 505 **Gear, drum, and cable:**

This subclass is indented under subclass 504. Systems in which the control member is a rotatable rod, shaft, or post which transmits motion through a gear to a drum and cable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

492+, for steering posts.

SEE OR SEARCH CLASS:

188, Brakes, subclasses 82.1+, for brakes applied to elements rotated relative to stationary elements to prevent retrograde rotation while allowing forward rotation.

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 266+ for apparatus for hauling or hoisting a load which includes a driven drum for pulling on or traveling along a cable, and wherein either the drum or the cable is attached to the load.

#### 506 **Drum and cable:**

This subclass is indented under subclass 504. Devices directly connected to a drum and cable.

#### 507 **Gear:**

This subclass is indented under subclass 504. Devices connected to gearing for operating it.

- 508 Variable ratio:**  
This subclass is indented under subclass 507. Devices which translate the forces applied thereto with varying ratios.
- (1) Note. The device may be either automatic, or be changed manually.
- 509 Screw and nut:**  
This subclass is indented under subclass 507. Devices in the form of screw and nut gearing used for transmitting force and motion from the rotatable control member to the controlled linkage.
- 510 Adjustable:**  
This subclass is indented under subclass 504. Devices consisting of rigid rotatable control members which are collapsible when not in use and adjustable either axially or transversely.
- 511 Mountings:**  
This subclass is indented under subclass 504. Devices for supporting and mounting hand operated rotatable rods, shafts, or posts, and their motion translating mechanisms.
- 512 Foot operated:**  
This subclass is indented under subclass 469. Systems which are operated by foot controlled members.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
482, for interconnected hand and foot operators.  
564, for foot rests.
- 513 Accelerator:**  
This subclass is indented under subclass 512. Systems in which the foot operated member operates a linkage system which controls a carburetor.
- 514 Signal:**  
This subclass is indented under subclass 512. Systems in which the foot operated member operates a linkage system which controls a signal.
- 515 Knee operated:**  
This subclass is indented under subclass 469. Systems operated by a knee controlled member.
- 516 Variable output force:**  
This subclass is indented under subclass 469. Systems having a mechanical unit which automatically varies the out-put force during the operation.
- 517 Flexible:**  
This subclass is indented under subclass 516. Systems wherein one element of the mechanical force varying unit is flexible.
- 518 Variable input leverage:**  
This subclass is indented under subclass 516. Systems which have an additional device for varying the leverage of a control element so as to vary the input force.
- 519 Levers:**  
This subclass is indented under subclass 469. Elements consisting of rigid structures which turn freely on a fixed pivot and impart pressure or motion from a source of power.
- SEE OR SEARCH CLASS:  
123, Internal-Combustion Engines, subclasses 90.39+, for a lever element in a poppet valve operating mechanism.
- 520 Toggle:**  
This subclass is indented under subclass 519. Elements hinged together and employed to transmit a varying force by lateral pressure on the hinge.
- SEE OR SEARCH CLASS:  
108, Horizontally Supported Planar Surfaces, subclass 81 for drop leaf extension surfaces having a toggle type diagonal brace.
- 521 Lazy tongs:**  
This subclass is indented under subclass 520. Devices consisting of a series of diagonal levers pivoted together in the middle and at the ends by which arrangement the device can be extended.

- (1) Note. When claimed in combination with a control mechanism, see the appropriate control subclass above.
- SEE OR SEARCH CLASS:  
248, Supports, subclass 277.1, for lazy tong brackets.
- 522 Adjustable:**  
This subclass is indented under subclass 519. Levers in which the relationship of parts may be varied as by varying the length of the lever or work arms or by varying the point of application of force or the position of the fulcrum.
- 522.5 Swing posts:**  
This subclass is indented under subclass 519. Devices which have one end fulcrumed on a fixed base and pivotally supporting at or adjacent the opposite end a reciprocating motion transmitting member.
- 523 Hand:**  
This subclass is indented under subclass 519. Levers specially designed for operation by hand.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
473.1+, for transmission control systems.  
545, for hand cranks.
- 524 Jointed:**  
This subclass is indented under subclass 523. Levers which are formed of a plurality of parts which are jointed together.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
522, for adjustable levers.
- 525 Adjustable:**  
This subclass is indented under subclass 523. Levers provided with means for adjusting their length or their arms with respect to each other.
- 526 Stops:**  
This subclass is indented under subclass 519. Devices positioned in the path of movement of levers to limit their movements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
565, for controller checks.
- 527 Detents:**  
This subclass is indented under subclass 469. Elements used in connection with fixed and movable members and especially adapted to check or arrest motion.
- (1) Note. Complete the search for this subject matter in Class 70, Locks, subclasses 192+, wherein the detent is, is operated, or is controlled by a lock.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
475, for detents for transmission controls.  
495, for position controllers for steering posts.
- SEE OR SEARCH CLASS:  
70, Locks, subclasses 192+ and see (1) Note, supra.  
166, Wells, subclasses 237+ and the subclasses there noted for detents in wells.  
292, Closure Fasteners, appropriate subclasses, especially those titled with catch or detent.
- 528 Hand crank:**  
This subclass is indented under subclass 527. Detents cooperating with hand cranks to prevent accidental movement.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
473.1+, for transmission controls.
- 529 Interrelated lever release:**  
This subclass is indented under subclass 527. Devices in which a detent acts on one element of the system to hold it in a predetermined position, the detent being connected to a second member of the system, and in order to release the element, the second member must first be operated to release the detent.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
478, for multiple foot operated control systems.

- 479+, for systems having multiple controlling elements.
- SEE OR SEARCH CLASS:  
192, Clutches and Power-Stop Control, subclass 13, for interconnected clutch and brake.
- 530 Gear:**  
This subclass is indented under subclass 527. Detents which consist of a body with a plurality of teeth which cooperate with similar teeth on the positioned member.
- 531 Friction:**  
This subclass is indented under subclass 527. Detents which have friction surfaces engaging the positioned member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
502, and 503, for systems having slidable members.  
539, for lever carried racks for cooperation with detents.
- 532 Lever engaging:**  
This subclass is indented under subclass 527. Detents consisting of hooks or struts which are engaged by a lever when it moves to a predetermined position.
- 533 Lever engaging rack:**  
This subclass is indented under subclass 527. Detents consisting of a toothed rack member with which a lever is adapted to be moved into engagement, the engaged tooth of the rack acting as a detent.
- 534 Pivoted:**  
This subclass is indented under subclass 533. Devices wherein the toothed rack member is pivoted.
- 535 Lever carried pawl:**  
This subclass is indented under subclass 533. Detents consisting of devices pivoted on a lever and adapted to fall into notches or teeth in a fixed member to restrain the lever from back motion.
- 536 Handle release:**  
This subclass is indented under subclass 533. Devices in which the detent is released by a handle carried by the lever.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
479, for multiple controlling elements for link and leverage systems.
- 537 Finger lever release:**  
This subclass is indented under subclass 533. Devices in which the detent is released by a lever which is so positioned on the control lever that it can be actuated by the fingers at the time of operation of the control lever.
- 538 Slidable:**  
This subclass is indented under subclass 537. Devices wherein finger levers are connected to the detent by a member slidably mounted on the control lever.
- 539 Pedal controlled:**  
This subclass is indented under subclass 533. Detents which are controlled by a pedal connected to the pawl.
- 540 Lever carried rack:**  
This subclass is indented under subclass 527. Detents which consist of a fixed member which cooperates with the teeth of a rack which is carried by a lever.
- 541 Pivoted:**  
This subclass is indented under subclass 540. Devices in which the rack is pivoted to the lever.
- 542 Pedal controlled:**  
This subclass is indented under subclass 540. Devices in which the racks are connected to a pedal which controls their position and effects their release from an operative position.
- 543 Handles:**  
This subclass is indented under subclass 469. Elements adapted to be grasped by the hand in lifting or using when claimed in combination with essential mechanical movement structure or which is definitely limited in use or application to the mechanical movement art.



- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
557, for handles for hand wheels.
- SEE OR SEARCH CLASS:  
16, Miscellaneous Hardware, subclasses 110.1+, when handle structure only is claimed without special art limitations.  
242, Winding, Tensioning, or Guiding, subclasses 283+ for specific handles incorporated in fishing reels.
- 544 Extension:**  
This subclass is indented under subclass 543. Devices which are adapted to be detachably secured to handles to facilitate their control from a remote point.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
546, for extensible hand cranks.  
562+, for extension pedals.
- 545 Hand crank:**  
This subclass is indented under subclass 543. Devices for causing rotation about an axis, consisting of a member extending at right angles to the axis and a hand grip attached to the free end of the member.
- 546 Extensible:**  
This subclass is indented under subclass 545. Devices in which the length of the crank arm is adjustable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
544, for extension handles.
- 547 Collapsible:**  
This subclass is indented under subclass 545. Devices in which the handle or crank arm may be folded or otherwise collapsed when not in use.
- 548 Shaft connections:**  
This subclass is indented under subclass 543. Devices for connecting a handle to a shaft in which the connections between the shaft and handle are either controlled by the handle itself or by a mechanism mounted on the handle.
- SEE OR SEARCH CLASS:  
292, Closure Fasteners, subclasses 348+, for analogous joints between door knobs and latch spindles.  
403, Joints and Connections, subclasses 230+ for joints of general application between a rod and a base, plate or head.
- 550 Engine starter type:**  
This subclass is indented under subclass 548. Devices between an engine crank shaft and the hand crank where there is no back-fire protective device incorporated.
- SEE OR SEARCH CLASS:  
123, Internal-Combustion Engines, subclasses 185.1+, for engine hand starter connections combined with a back-fire protective device.
- 551 Holders:**  
This subclass is indented under subclass 550. Devices for holding an engine starter crank in a predetermined position when not in use.
- 551.1 Handle bars:**  
This subclass is indented under subclass 543. Devices in the form of a handle bar for a bicycle or like device.
- SEE OR SEARCH CLASS:  
403, Joints and Connections, appropriate subclasses for mere joints including joints for securing a bar to a steering post. The mere naming of the elements will not exclude joint subject matter from Class 403.
- 551.2 Spring biased or supported:**  
This subclass is indented under subclass 551.1. Devices in which the bar is spring biased or supported for shock absorbing purposes.
- 551.3 Folding or adjustable:**  
This subclass is indented under subclass 551.1. Devices in which the bar is foldable or adjustable relative to the post.
- 551.4 Sectional:**  
This subclass is indented under subclass 551.3. Devices in which the bar is made up of separate sections.

**551.5 Simultaneously movable:**

This subclass is indented under subclass 551.4. Devices in which the sections are constrained to move simultaneously.

**551.6 Continuous:**

This subclass is indented under subclass 551.3. Devices in which the bar is continuous from end to end.

**551.7 With handle latch:**

This subclass is indented under subclass 551.6. Devices in which the bar is locked in adjusted position by means of a latch operable from hand grip of the bar.

SEE OR SEARCH CLASS:

403, Joints and Connections, subclasses 321+ for joint structure having a manipulable latch.

**551.8 Attachments and accessories:**

This subclass is indented under subclass 551.1. Attachments and accessories specially designed for use with handle bars.

**551.9 Handholds and grips:**

This subclass is indented under subclass 551.1. Handholds and grips for handle bars.

SEE OR SEARCH THIS CLASS, SUBCLASS:

558.5, and see the notes thereto for covers and protectors for the operating end of a lever or a handle.

SEE OR SEARCH CLASS:

16, Miscellaneous Hardware, subclasses 110+, for handles in general.

**552 Hand wheels:**

This subclass is indented under subclass 543. Devices comprising hand operated control wheels, e.g., steering wheels.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 894+, for the method of making wheels.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for molding or shaping processes within the class definition

which may include molding of a wheel.

**553 Knob or dial:**

This subclass is indented under subclass 552. Devices comprising hand operated rounded or wheel-shaped members adapted for attachment to a rotary shaft.

SEE OR SEARCH CLASS:

16, Miscellaneous Hardware, subclass 121, for knobs.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for molding or shaping processes within the class definition which may include molding and uniting.  
292, Closure Fasteners, subclass 347, for door knobs.  
403, Joints and Connections, subclasses 230+ for a rod connected transversely to a plate.

**554 Slidable:**

This subclass is indented under subclass 552. Hand wheels having connections with rotary shafts which permit the hand wheel to be slid to inoperative positions relative to the shafts when not in use.

**555 Pivoted:**

This subclass is indented under subclass 552. Hand wheels which are pivoted to a rotary shaft, the pivoted connection permitting movement of the hand wheel to an inoperative position by rotary motion about the pivotal axis.

**556 Releasable:**

This subclass is indented under subclass 555. Pivoted hand wheels with locking means for holding the hand wheel in a predetermined position relative to its pivotal axis.

SEE OR SEARCH CLASS:

70, Locks, subclasses 207 through 224, for the locking means, per se.

**557 Handles:**

This subclass is indented under subclass 552. Handles adapted to be grasped by the hand which are attached to a hand wheel to facilitate its operation.

**558 Rim grips and covers:**

This subclass is indented under subclass 552. Devices attached to the wheel rim to facilitate gripping of the wheel.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

558.5, for covers and protectors for the operating end of a lever or a handle.

**558.5 Caps and covers:**

This subclass is indented under subclass 543. Devices for covering or cushioning a hand engaging portion of an existing handle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

551.9, for handholds and grips for handle bars.

558, for rim grips and covers for hand-wheels.

563, for pads and covers for pedals.

**559 Rocker arms:**

This subclass is indented under subclass 469. Elements comprising crank arms fixedly attached to oscillatable shafts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

543+, for handles.

595, for cranks and wrist pins.

SEE OR SEARCH CLASS:

403, Joints and Connections, subclasses 230+ for a rod connected transversely to a plate.

**560 Pedals:**

This subclass is indented under subclass 469. Elements comprising foot engaging levers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

481, for interconnected hand and foot operators for systems.

512+, for foot operated systems.

539, and 542, for pedal controlled detents for levers.

594.1, for cranks and pedals.

SEE OR SEARCH CLASS:

116, Signals and Indicators, subclass 62, for bicycle pedal actuated bells.

192, Clutches and Power Control, subclasses 217.1+, for bicycle coaster brakes.

**561 Treadles:**

This subclass is indented under subclass 560. Levers designed to impart motion to a mechanism through a connecting rod and crank.

SEE OR SEARCH CLASS:

105, Railway Rolling Stock, subclass 93, for treadle operated trackman's car drives.

451, Abrading, subclass 341 for a double treadle frame or mount for abrading.

**562 Extension:**

This subclass is indented under subclass 560. Devices having means connected to or contacting the pedal which constitutes an additional foot engaging portion.

- (1) Note. Many of these devices in this subclass are mounted directly on the foot engaging portion of the pedal and either (1) enable operation from a remote point or (2) constitute a lengthening adjustment for the pedal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

480, for devices in which there are a plurality of independently operable control systems which may be connected and operated by a single controlling member.

544, for extension handles.

546, for extensible hand cranks.

**562.5 Offset:**

This subclass is indented under subclass 562. Devices wherein the additional foot engaging mechanism is so mounted that its zone of operation is to one side of the zone of operation of the pedal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

478.5, for pedal extensions so positioned that a single foot may operate an addi-

tional pedal or controller concurrently with the pedal provided with the extension.

**563 Pads and covers:**

This subclass is indented under subclass 560. Devices comprising coverings for the foot engaging portions of pedals.

SEE OR SEARCH THIS CLASS, SUBCLASS:

558.5, and see the notes thereto for covers and protectors for the operating end of a lever or a handle.

**564 Foot rests:**

This subclass is indented under subclass 469. Elements located adjacent pedals to support a portion of the foot during the pedal operation.

SEE OR SEARCH CLASS:

84, Music, subclass 232, for foot rests for piano pedals.  
296, Land Vehicles: Bodies and Tops, subclass 75, for foot rests for passengers.  
297, Chairs and Seats, subclasses 423.1+, for a leg-, knee-, or footrest for a seated person particularly subclass 423.17 for laterally bearing leg rest to relieve a leg from strain in operative position of the foot with respect to a pedal for a control lever and linkage system.

**565 Controller checks:**

This subclass is indented under subclass 469. Elements placed in the path of controllers to limit their speed of operation to a predetermined maximum.

SEE OR SEARCH THIS CLASS, SUBCLASS:

526, for lever stops.

SEE OR SEARCH CLASS:

188, Brakes, subclasses 266+, for an internal resistance brake of general utility.  
318, Electricity: Motive Power Systems, subclasses 543+, for motor controllers.  
388, Electricity: Motor Control Systems, subclasses 800+ and 825+ for single motor running-speed control systems

with, and without, feedback, respectively.

**566 Slot closers and lever guards:**

This subclass is indented under subclass 469. Elements which are (1) attached to levers to close slots in which such levers move so as to prevent the passage of dust and oil; (2) movable in front of operating members to prevent their accidental operation.

SEE OR SEARCH CLASS:

180, Motor Vehicles, subclass 90.6, for slot closers attached to control levers of an automobile.

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 144+ for a chain guard.

**567 Cams:**

This subclass is indented under the class definition. Elements comprising a rotatable, oscillatable, or reciprocable machine element (usually a plate or a cylinder) having a surface or a groove formed therein of predetermined contour which will impart a prescribed motion of reciprocation or oscillation such as generally cannot be obtained by gear wheels or link motion, to a follower slidably contacting with such surface or groove.

SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclasses 90.48 through 90.6, for a cam or a follower in a poppet valve operating mechanism.

**568 Adjustable:**

This subclass is indented under subclass 567. Devices comprising a cam or a part thereof adjustable longitudinally or transversely of its axis of rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

838+, for adjustable cam changing a stroke "on the fly".

SEE OR SEARCH CLASS:

417, Pumps, subclasses 218+, for condition responsive control of an adjustable cam type pump drive.

**569 Follower:**

This subclass is indented under subclass 567. Devices comprising an element adapted to slidably contact with and to be moved by a cam.

**570.1 Eccentric:**

Subject matter under subclass entitled ELEMENTS comprising a mass having a center of gravity offset from geometrical center.

SEE OR SEARCH THIS CLASS, SUBCLASS:

116, for eccentric drives for rotary to intermittent unidirectional movement.

**570.2 Plural, movable relative to each other (including ball(s)):**

This subclass is indented under subclass 570.1. Subject matter having at least two masses that can travel independently.

**570.21 Concentric:**

This subclass is indented under subclass 570.2. Subject matter wherein the plural movable eccentric masses are located one inside the other.

**570.3 Having anti-friction means, e.g., roller bearing, lubrication, etc.:**

This subclass is indented under subclass 570.1. Subject matter wherein the eccentric has structure to facilitate the reduction of resistance generated by two moving parts.

SEE OR SEARCH THIS CLASS, SUBCLASS:

117, for adjustable eccentric drives for rotary to intermittent unidirectional movement.

835, for adjustable eccentric and strap changing a stroke "on the fly".

**571.1 Adjustable:**

This subclass is indented under subclass 570.1. Subject matter wherein the eccentric has structure allowing the mass to change position relative to a fixed datum, e.g., a shaft, etc.

**571.11 Radially:**

This subclass is indented under subclass 571.1. Subject matter wherein the eccentric has structure allowing the mass to change position rela-

tive to a radius of a fixed datum, e.g., a shaft radius, etc.

**572.1 Power generating-type flywheel:**

Subject matter under subclass entitled ELEMENTS comprising a mass used in a system to produce mechanical or electrical energy.

- (1) Note. Where additional characteristics are claimed which limit the wheel or other rotor to particular arts, e.g., gears, vehicle wheels, centrifugal separators, turbines, dynamos, etc., the patent will be placed with the appropriate art and cross referenced here, but the mere designation of the device by name will not exclude the same from this subclass or the indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for gyroscopes.

SEE OR SEARCH CLASS:

- 123, Internal-Combustion Engines, subclass 179.22 for mechanical starting devices.
- 310, Electrical Generator or Motor Structure, subclass 74 for rotary dynamo-electric devices having a flywheels, and subclass 153 for magnetos built into a flywheel.
- 322, Electricity: Single Generator Systems, subclass 4 for generator systems where the generator is provided with flywheels or massive moving parts.

**572.11 Structural detail, e.g., material, configuration, superconductor, discs, laminated, etc.:**

This subclass is indented under subclass 572.1. Subject matter for a power generating flywheel subcombination highlighting a specific feature of the mass, such as chemical, electrical, or mechanical make-up, etc.

**572.12 Containing fiber or filament:**

This subclass is indented under subclass 572.11. Subject matter wherein the power generating flywheel specific feature is a thread-like or strand-like member.

**572.2 Flywheel, motion smoothing-type:**

Subject matter under subclass entitled ELEMENTS comprising a mass used to modulate

or control the inertia or momentum of a mechanical system.

- (1) Note. Where additional characteristics are claimed which limit the wheel or other rotor to particular arts, e.g., gears, vehicle wheels, centrifugal separators, turbines, dynamos, etc., the patent will be placed with the appropriate art and cross referenced here, but the mere designation of the device by name will not exclude the same from this subclass or the indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5.95, for flywheels in gyroscopes.

433.5, for flywheel and gear combination.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 894 for wheel making.

73, Measuring and Testing, subclass 66 for rotor unbalance.

**572.21 Structural detail, e.g., fiber, held by magnet, etc.:**

This subclass is indented under subclass 572.2. Subject matter highlighting a specific feature of the mass, such as chemical, electrical, or mechanical make-up, etc.

**572.4 Balancing for drum, e.g., washing machine or arm-type structure, etc., e.g., centrifuge, etc.:**

Subject matter under subclass entitled ELEMENTS comprising structure for maintaining the equilibrium of (a) a barrel-like structure rotatable about a single axis, used in a clothes cleaning system, or (b) a long, slender support rotatable at one end about a single axis, used in a spinning system to separate material.

**573.1 With fluid balancing means:**

This subclass is indented under subclass 572.2. Subject matter in which the flywheel has a liquid or gas to maintain equilibrium or stability.

**573.11 And pressure compensation:**

This subclass is indented under subclass 573.1. Subject matter in which the flywheel has fluid balancing including a device, e.g., a valve, etc., to regulate the force generated by the liquid or gas in the system.

**573.12 And elastic device:**

This subclass is indented under subclass 573.1. Subject matter in which the flywheel has fluid balancing including a device, e.g. elastomeric blocks, etc., to absorb vibration.

**573.13 And bearings:**

This subclass is indented under subclass 573.1. Subject matter in which the flywheel has fluid balancing including an anti-friction device comprising spheres movable inside a track.

**574.1 With electrical or magnetic damping:**

This subclass is indented under subclass 572.2. Subject matter in which the flywheel utilizes the flow of electrons or the attractive-repulsive property of materials to suppress vibration.

**574.2 Damping using swinging masses, e.g., pendulum-type, etc.:**

This subclass is indented under subclass 572.2. Subject matter wherein vibration is suppressed by the flywheel utilizing an additional movable mass mounted on a support, in which the mass moves away from the support to a rotating member, e.g. shaft, connection, etc.

**574.3 Damping by increasing frictional force:**

This subclass is indented under subclass 572.2. Subject matter in which the flywheel utilizes resistance generated by two moving parts to suppress vibration.

**574.4 Damping by absorbing vibration force (via rubber, elastomeric material, etc.)**

This subclass is indented under subclass 572.2. Subject matter in which the flywheel utilizes the property of some materials to suppress an asymmetric motion of the flywheel from a state of equilibrium.

**575 Pawls and ratchets:**

This subclass is indented under the class definition. Elements limited to the structural details of a pawl or ratchet.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

144+, for grip units for intermittent grip type mechanical movements, especially subclasses 149+, for power pawl lifters.

## SEE OR SEARCH CLASS:

- 81, Tools, subclasses 61+, for pivoted pawl type ratchet wrenches or screw-driver heads.
- 160, Flexible or Portable Closure, Partition, or Panel, subclasses 296, 297 and 300+, for ratchet mechanisms, for spring rollers.
- 188, Brakes, subclasses 30, 61 and 82.1+, for one way brakes.
- 192, Clutches and Power-Stop Control, subclasses 41+, for one way clutches and 51, for multiple reversing clutches.
- 235, Registers, subclass 131, for overthrow preventers.
- 368, Horology: Time Measuring Systems or Devices, subclasses 124+, for electric clock escapements.
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 120+, for a tool of that class caused to rotate by a ratchet.

**576 Noiseless:**

This subclass is indented under subclass 575. Devices comprising pawls held out of engagement with the ratchet wheel during rotation of the latter in one direction and moved into engagement with said ratchet wheel on the reverse rotation of the latter.

**577 Pivoted pawls:**

This subclass is indented under subclass 575. Devices comprising pawls mounted for oscillation on a pivot.

**578 Sliding pawls:**

This subclass is indented under subclass 575. Devices comprising pawls mounted for sliding movement.

**579 Pitmans and connecting rods:**

This subclass is indented under the class definition. Elements comprising an intermediate connector having a bearing at each end for transmitting motion by a push and pull movement.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 597, and 598, for sectional cranks and wrist pins.

## SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 428+ for processes of assembling bearings in the ends of rods, and subclasses 888.4+ for methods of making poppet valves.
- 105, Railway Rolling Stock, subclass 84, for locomotive connecting rods.
- 123, Internal-Combustion Engines, subclasses 90.61+, for a rod element in a poppet valve operating mechanism.
- 384, Bearings, subclasses 276+ for sleeves, or liners.
- 403, Joints and Connections, subclasses 52+ for articulated members in general.

**580 Radial:**

This subclass is indented under subclass 579. Devices comprising two or more connecting rods operatively connected to the same crank pin.

## SEE OR SEARCH CLASS:

- 91, Motors: Expansible Chamber Type, subclasses 491+, for expansible chamber type motors having a plurality of radially arranged cylinders.
- 92, Expansible Chamber Devices, subclass 148 for an expansible chamber device having a plurality of rigidly interconnected radially arranged cylinders.
- 123, Internal-Combustion Engines, subclasses 44 and 54.2+ for an engine of that class type which uses a radial pitman or connecting rod.

**581 Yieldable:**

This subclass is indented under subclass 579. Devices comprising connecting rods having yieldable means embodied therein for allowing limited relative movement between the ends thereof.

**582 Longitudinal springs:**

This subclass is indented under subclass 581. Devices comprising yieldable means consisting of coil springs, the axes of which extend coincident with or parallel to the longitudinal axis of the connecting rod, giving only linear yieldability.

**583 Fluid cushion:**

This subclass is indented under subclass 581. Devices comprising yieldable means consisting of fluid means.

**584 Automatic release:**

This subclass is indented under subclass 581. Devices wherein the yieldable means yields only after predetermined pressure has been applied to ends of the link.

- (1) Note. The device may include a frangible connection.

SEE OR SEARCH CLASS:

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for safety devices for bolt and rivet making machines.

**585 Toggle link type:**

This subclass is indented under subclass 584. Devices wherein the yieldable means consists of a toggle mechanism.

- (1) Note. The toggle mechanism as a complete unit must be a part of and movable with the rod. If part of the toggle mechanism is pivoted to any part of the machine the said device is classified with the machine.

**586 Longitudinally adjustable:**

This subclass is indented under subclass 579. Devices comprising connecting rods having an adjusting means embodied therein for regulating the length thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

501.5, for constant tension sustaining devices for flexible cable operators.

SEE OR SEARCH CLASS:

100, Presses, subclass 257 for reciprocating platen presses, not elsewhere provided for, having means to adjust the range of movement of the platens.

123, Internal-Combustion Engines, subclass 48 for adjustable combustion chambers.

188, Brakes, subclasses 196+ for slack position adjusters.

**587 Hollow rod, lubricated:**

This subclass is indented under subclass 579. Devices comprising connecting rods having a hollow shank or an oil conduit incorporated therewith, between the opposite bearing ends, whereby lubricant can be supplied to said ends.

SEE OR SEARCH CLASS:

184, Lubrication, subclass 6, for systems and subclass 24, for swab piston-rod lubricators.

**588 Sheet metal type:**

This subclass is indented under subclass 579. Devices comprising connecting rods fabricated from sheet metal.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 888.09+, for methods of making and assembling pistons and pitmans.

428, Stock Material or Miscellaneous Articles, subclasses 544+ for stock material, e.g., of indefinite length, which is all metal or has adjacent metal components.

**589 Counterbalanced:**

This subclass is indented under subclass 579. Devices comprising connecting rods having counterweights directly attached thereto for balancing the same about a bearing end.

SEE OR SEARCH CLASS:

267, Spring Devices, subclasses 113+, for hydropneumatic counter-balances, per se.

310, Electrical Generator or Motor Structure, subclass 153 for flywheels and rotors.

**590 Weight type:**

This subclass is indented under subclass 589. Weight devices for assisting connecting rods to move a load connected thereto.

**591 Rotating:**

This subclass is indented under subclass 590. Weight devices attached to a rotating arm for assisting the connecting rod to move a load connected thereto.



SEE OR SEARCH THIS CLASS, SUB-CLASS:

603, for counterbalanced cranks and wrist-pins.

SEE OR SEARCH CLASS:

16, Miscellaneous Hardware, subclasses 403 and 404, and see the notes thereto, for weights, per se.

310, Electrical Generator or Motor Structure, subclass 261 for counterbalanced flywheels and rotors.

## 592 **Spring:**

This subclass is indented under subclass 589. Spring devices for assisting the connecting rod to move a load connected thereto.

## 593 **Section coupled:**

This subclass is indented under subclass 579. Devices in which the rod comprises a pair of sections, each section sliding on a portion of the other, and having a means thereon for coupling and uncoupling said sections whereby one section will move simultaneously with or relatively to the other for transmitting or interrupting the flow of power from one bearing end to the other.

## 594 **Bearings, adjustable:**

This subclass is indented under subclass 579. Devices comprising connecting rods having the end bearings thereof adjustable relative to the shank of the rod.

## 594.1 **Cranks and pedals:**

This subclass is indented under the class definition. Elements comprising a unit consisting of an arm rotating about an axis and a crank pin projecting transversely from said arm for the attachment of a foot pedal, the first mentioned axis and the axis of the pin being substantially parallel to each other.

(1) Note. The crank bearing and hanger and the pedal may be included.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

560+, for foot levers.

595+, for cranks and wrist pins.

SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, subclass 2.5, for combinations of a wheel, axle and pedal crank.

384, Bearings, subclass 431 for a pedal type crank bearing with support means.

403, Joints and Connections, appropriate subclasses, especially subclasses 230+ for a joint between a rod and a plate.

## 594.2 **With attached gear:**

This subclass is indented under subclass 594.1. Units which have a gear attached thereto.

## 594.3 **Variable:**

This subclass is indented under subclass 594.1. Units having incorporated therewith a self-actuated means for adjusting the axis of the pin relative to the axis of rotation of the arm continuously throughout the complete revolution of the arm.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

602, for variable cranks and wrist pins.

## 594.4 **Pedals:**

This subclass is indented under subclass 594.1. Foot engaging units and their attachment to the crank arm.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

560+, for pedals, per se.

## 594.5 **Counterbalanced:**

This subclass is indented under subclass 594.4. Pedals which have means to counterbalance them so that the foot engaging portion always remains up.

## 594.6 **With toe or shoe clips:**

This subclass is indented under subclass 594.4. Pedals having some means to hold the toe of a shoe on the pedal.

## 594.7 **Adjustable or folding:**

This subclass is indented under subclass 594.4. Pedals which are adjustable for various width shoes or are adapted to be folded against the crank arm.

## SEE OR SEARCH CLASS:

280, Land Vehicles, subclass 294, for pedals with foldable attachments to be used as props.

**595 Cranks and wrist pins:**

This subclass is indented under the class definition. Elements comprising a unit consisting of an arm rotating or oscillating about an axis and a crank pin projecting transversely from said arm for the attachment of a connecting rod, the first mentioned axis and the axis of the pin being substantially parallel to each other.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

25+, for mechanical movements of the rotary to and/or from reciprocating or oscillating type.  
63+, for mechanical movements of the rotary to rotary type.  
110, for mechanical movements of the reciprocating to reciprocating type.

## SEE OR SEARCH CLASS:

29, Metal Working, subclasses 6.01 and 888.08, for methods and apparatus for making crankshafts.  
403, Joints and Connections, subclasses 52+ for articulated rod members in general.

**596 Multiple throw:**

This subclass is indented under subclass 595. Units integrally united, the axes of rotation of the arms of each unit being coaxial with each other.

**597 Sectional:**

This subclass is indented under subclass 596. Units made in sections and subsequently united by bolting, riveting, or welding.

**598 Sectional:**

This subclass is indented under subclass 595. Units made in sections and subsequently united by bolting, riveting, or welding.

**599 Yieldable:**

This subclass is indented under subclass 595. Units having a yieldable joint between the ends of the crank arm whereby said ends are capable of angular movement relative to each other.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

470, for control linkage and leverage systems having resilient connections.

**600 Adjustable:**

This subclass is indented under subclass 595. Units having incorporated therewith a means for adjusting the axis of the pin relative to the axis of rotation of the arm to adjust the throw of the crank.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

117, for having adjustable rotary crank drives for intermittent grip type mechanical movements.  
837, for adjustable cranks and wrist pins changing a stroke "on the fly".

## SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclass 48, for adjustable combustion chambers.

**601 Automatically:**

This subclass is indented under subclass 600. Units having incorporated therewith means for automatically adjusting the axis of the pin relative to the axis of rotation of the arm according to the speed of rotation of said arm to automatically adjust the throw of the crank.

**602 Variable:**

This subclass is indented under subclass 595. Units having incorporated therewith a self-actuated means for adjusting the axis of the pin relative to the axis of rotation of the arm continuously throughout the complete revolution of the arm.

## SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclass 48, for adjustable combustion chambers and 78, for variable clearance for cycle engines.

**603 Counterbalanced:**

This subclass is indented under subclass 595. Units having means attached to the arm thereof for counter-acting the centrifugal force exerted by the unit.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

591, for weights attached to crank arms for assisting a connecting rod to move a load.

**604 Vibration dampers:**

This subclass is indented under subclass 603. Units having a device connected thereto for damping vibrations created in/by the unit.

SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclasses 192.1+, for compensating devices.

310, Electrical Generator or Motor Structure, subclass 261 for vibration damping means for flywheels and rotors.

**605 Lubricated:**

This subclass is indented under subclass 595. Units having the arm and/or the pin thereof modified for lubricating the peripheral surfaces of the pin.

**606 Gear casings:**

This subclass is indented under the class definition. Elements for inclosing and supporting gearing in assembled relationship.

(1) Note. This subclass and the ones hereunder are limited to the casing structure, per se. If the novelty resides completely or partially in the inclosed gearing, classification is with the particular type of gearing. If the casing is intended for use with a particular element or apparatus, classification is with the element or the apparatus, respectively.

(2) Note. See Index to Classification of Patents under "Casings".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

612+, for casing structure movable with respect to its inclosed elements.

SEE OR SEARCH CLASS:

83, Cutting, subclasses 440.2, 544+, 814, and 860, for guards for cutting machines.

92, Expansible Chamber Devices, subclasses 147+ for a plurality of unitarily mounted cylinders combined with a casing or support for a rotary shaft, subclass 161 for a support or frame for an expansible chamber device, and subclass 261 for a crankshaft housing (e.g., crankcase), per se. For a statement of the line between Class 74 and Class 92, see section III of this class definition of Class 92 under SEARCH CLASS 74.

144, Woodworking, subclasses 251.1+ for a cutter guard for a tool of that Class.

464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 170+ for a housing for a rotary shaft.

**607 Axle and torque tubes:**

This subclass is indented under subclass 606. Housings for inclosing and holding automotive differential gearing in assembled relationship.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 581 for a metallic intermediate article in the form of a symmetrical panel.

475, Planetary Gear Transmission Systems or Components, subclasses 200+ for planetary gear differentials.

**608 Guards:**

This subclass is indented under the class definition. Housings for merely inclosing gearing for the express purpose of preventing injury to/by said gearing.

(1) Note. If the structure is adapted to be used with a particular machine, classification is with the machine. However, this subclass and the indented subclasses are limited to structures not otherwise classified and for which no subclass is provided in the art classes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

566, for lever guards.

**609 For rotary member:**

This subclass is indented under subclass 608. Housings, the portion of the gearing inclosed is a wheel member thereof.

- (1) Note. For supporting mountings for gear shafts claimed in combination with particular types of gearing, search appropriate gearing subclasses.

## SEE OR SEARCH CLASS:

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 144+ for a guard or housing for a belt and pulley power transmission.

**612 Guard mechanisms:**

This subclass is indented under the class definition. Elements for preventing injury to an operator of a machine during the operation thereof.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

608+, for guards stationary relative to the guarded element.

**613 Automatic:**

This subclass is indented under subclass 612. Mechanisms comprising guards actuated into protective position by some part of the machines.

## SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 133 through 137, for stop mechanisms.

**614 Oscillating member actuator:**

This subclass is indented under subclass 613. Mechanisms wherein a part of the machine is an oscillating member.

**615 Reciprocating member actuator:**

This subclass is indented under subclass 613. Mechanisms wherein a part of the machine is a reciprocating member.

**616 Operator controlled:**

This subclass is indented under subclass 612. Means actuated by the operator simultaneously with the starting device of a machine for pre-

venting injury to the operator of such a machine during operating thereof.

- (1) Note. This subclass does not include those mechanisms which prevent starting of the machine until the guarding element has been shifted to its proper guarding position, for which see Class 192, Clutches and Power-Stop Control, subclasses 133+.

## SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, subclasses 133+ and see (1) Note, supra.

**617 Set screw:**

This subclass is indented under subclass 612. Devices for shielding the heads of set screws against injury thereto and/or to persons.

**625 ALTERNATE MANUAL OR POWER OPERATORS:**

This subclass is indented under the class definition. Devices having provision for operation of a single driven device alternately by either manual or power means.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

665+, for plural concurrent gearing drives.

## SEE OR SEARCH CLASS:

30, Cutlery, subclass 203, for shears which may either be hand or power operated.

172, Earth Working, subclasses 485+ for an earth working implement adapted to be lifted for transport by a power actuator and/or a manual actuator.

251, Valves and Valve Actuation, particularly subclasses 14 and 130 for valve actuation involving alternate manual and power actuation.

318, Electricity: Motive Power Systems, subclass 2, for combined controlled electric motors and manual operators for actuating one or more common load devices.

417, Pumps, subclass 374, for pumps having both manual and motor drive means therefor.

475, Planetary Gear Transmission Systems or Components, subclasses 1+ for input from independent power sources to a planetary gear transmissions.

#### 640 GEARING:

This subclass is indented under the class definition. Mechanism comprising relatively rotatable bodies or combinations of such bodies provided with teeth or interengaging elements, chains and sprockets, belts, and pulleys or other means not otherwise classified, whereby a rotatable body will impart to or receive motion or power from some other member by rolling contact.

(1) Note. EXPLANATORY NOTE: In 1988 a new class (Class 475) was formed by taking all subclasses relating to planetary gearing from Class 74 which appeared below subclass 640 in the Class 74 schedule. However, subclasses appearing above Class 640 in the Class 74 schedule were not screened for arrangements that might include planetary gearing, and so such higher appearing subclasses should be given consideration for a complete search on planetary gearing combinations.

(2) Note. For guide pulleys and rollers, see Class 474, Endless Belt Power Transmission Systems or Components, appropriate subclasses. Class 193, Conveyors, Chutes, Skids, Guides, and Ways, appropriate subclasses; and 384, Bearing, appropriate subclasses.

(3) Note. The rack of a rack and pinion is here included on the theory that a rack is a portion of the contacting surface of a gear of infinite radius.

#### SEE OR SEARCH CLASS:

193, Conveyors, Chutes, Skids, Guides, and Ways, appropriate subclasses (and see (2) Note, supra).  
352, Optics: Motion Pictures, subclasses 166+ for gearing specifically adapted for motion picture apparatus.  
384, Bearings, appropriate subclasses and see (2) Note, supra.

408, Cutting by Use of Rotating Axially Moving Tool, subclasses 124+, for drilling machines including drive structure; and see the notes in that class definition.

464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 51+ for a flexible connection between a shaft and a member driven by the shaft.

474, Endless Belt Power Transmission Systems or Components, and see (2) Note, supra.

475, Planetary Gear Transmission Systems or Components, for planetary gears and planetary gear transmission.

#### 650 Nonplanetary gearing differential type (e.g., gearless differentials):

This subclass is indented under subclass 640. Gearing, not of the planetary type, wherein a differential action is obtained through some mechanisms other than a planetary gearing, such as e.g., overruning clutches acting between a driving member and a plurality of driven members, a fluid drive involving plural power paths combined with other gearing, etc. Such structures are commonly designated "gearless" differentials.

#### SEE OR SEARCH CLASS:

60, Power Plants, subclass 485, for rotary type hydraulic differentials.  
192, Clutches and Power-Stop Control, subclasses 41+, for one way clutches, per se, and see especially subclass 50 for plural clutches associated with parallel vehicle wheels permitting either wheel to overrun.  
475, Planetary Gear Transmission Systems or Components, subclasses 220+, for planetary gear differentials.

#### 655 Single gearing unit includes fluid drive:

This subclass is indented under subclass 640. Gearing units wherein a fluid drive mechanism is included as a part of the intermediate internal mechanism of a single gearing unit.

#### SEE OR SEARCH THIS CLASS, SUBCLASS:

730.1+, and see the notes thereto, for combined gearing and fluid drives.

**661 Plural prime movers selectively coupled to common output:**

This subclass is indented under subclass 640. Gearing in which means are provided to connect plural prime motors either individually or unitarily to the same load.

**SEE OR SEARCH CLASS:**

- 60, Power Plants, subclasses 698+ for a residual system of plural motors.
- 475, Planetary Gear Transmission Systems or Components, subclasses 1+, for plural power inputs to planetary gearing.

**664 Plural power paths from prime mover:**

This subclass is indented under subclass 640. Gearing wherein a single prime mover drives plural power paths, at least one path involving a gearing.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 661, for plural prime movers selectively coupled to common output.

**SEE OR SEARCH CLASS:**

- 180, Motor Vehicles, subclasses 6.2+ for a motor vehicle which is steered by creating a difference between the driving effort developed by one or more traction elements located on one side of the vehicle and the driving effort developed by one or more traction elements located on the other side thereof, which may involve the control of plural power paths emanating from a prime mover.
- 475, Planetary Gear Transmission Systems or Components, for plural power paths to or from planetary gearing.

**665 Plural power paths to and/or from gearing:**

This subclass is indented under subclass 640. Gearing in which a plurality of power paths constitute either the input or the output of the gearing.

- (1) Note. For the most part, the gearing serves either to divide a single input into a plurality of outputs, or combine a plurality of inputs into a single output.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 11+, for power take offs.
- 625+, for alternate manual and power operators in general.
- 661, for plural prime movers selectively coupled to common output.
- 810.1+, for nonplanetary gearing wherein reverse torque changes power transmission to an alternate path.

**SEE OR SEARCH CLASS:**

- 180, Motor Vehicles, subclasses 6.2+ as explained in the reference thereto appearing in subclass 664 above.
- 188, Brakes, appropriate subclasses, for brakes mounted on motor vehicles, not structurally related to a gearing (which is not specifically claimed) for controlling the gearing; i.e., brakes on the rear axle which are independently operable and hence incidentally control the relative output of the differential.
- 192, Clutches and Power-Stop Control, the un-numbered title "Interrelated power delivery controls" and see the notes thereto for interrelated control of one or more of prime movers, clutches, gearing, brakes and loads by name only.
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 31+, for the combination of plural tools of that class type combined with drive means utilizing plural power path gearing.
- 475, Planetary Gear Transmission Systems or Components, for plural power paths to or from planetary gearing.

**670 Alternate input connections single hand crank:**

This subclass is indented under subclass 665. Gearing in which a separable operating crank may be applied at any one of a plurality of points to actuate the driven shaft directly or through gearing.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 625+, for alternate manual and power operators.

**718 Fluid drive divides or combines alternate paths:**

This subclass is indented under subclass 665. Gearing wherein a fluid drive either divides or combines alternate plural power paths to and/or from the gearing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

730.1+, and see the notes thereto, for combined gearing and fluid drives.

SEE OR SEARCH CLASS:

475, Planetary Gear Transmission Systems or Components, subclasses 31+, for fluid drive combined with planetary gearing.

**720 One path includes fluid drive:**

This subclass is indented under subclass 665. Gearing wherein a fluid drive is included in one of the plural paths.

**721 Friction-type gearing:**

This subclass is indented under subclass 665. Gearing in which the gearing is of the friction type.

SEE OR SEARCH CLASS:

476, Friction Gear Transmission Systems or Components, for friction gear transmissions, per se.

**724 Worm-type gearing:**

This subclass is indented under subclass 665. Gearing wherein the gearing unit is of worm gear type.

SEE OR SEARCH THIS CLASS, SUBCLASS:

425, for worm type gearing, per se.

**730.1 With fluid drive:**

This subclass is indented under subclass 640. Subject matter wherein gearing is combined with a fluid force torque transmitting device to form a drive train.

SEE OR SEARCH CLASS:

60, Power Plants, subclasses 325+ for the various pumpmotor drives, per se.

192, Clutches and Power-Stop Control, subclasses 3.21+ for a fluid drive of the impeller-turbine type combined with a clutch and 3.34 for the combination with a brake.

475, Planetary Gear Transmission Systems or Components, subclasses 22+ for fluid drives used for steering by driving and 31+ for other arrangements of fluid drives with planetary gearing.

477, Interrelated Power Delivery Controls, Including Engine Control, for fluid drives used in combination with interrelated transmission and engine control.

**731.1 Condition responsive control:**

This subclass is indented under subclass 730.1. Subject matter wherein means are provided to sense a condition or change of condition in the drive train and in response to such sensing effect a control function on the drive train.

(1) Note. Usually the control function is a change in the speed ratio.

SEE OR SEARCH THIS CLASS, SUBCLASS:

336+, and 337, for automatic ratio change nonplanetary gearing.

SEE OR SEARCH CLASS:

475, Planetary Gear Transmission Systems or Components, subclasses 19, 42, 43, 48+, 51, 60+, 76+, 94+, 118+, 125+, 153, 186, 199, 208, and 254+ for various planetary transmission with condition responsive control.

**732.1 With one or more controllers for gearing, fluid drive, or clutch:**

This subclass is indented under subclass 730.1. Subject matter wherein means is provided to regulate the operation of the gearing or fluid drive; or to regulate the operation of a clutch.

**733.1 With interrelated controls:**

This subclass is indented under subclass 732.1. Subject matter wherein two of the regulating means are either controlled by a single actuator or are otherwise related such that the operation of one affects the operation of the other.

## SEE OR SEARCH CLASS:

- 192, Clutches and Power-Stop Control, subclasses 3.51+ and 215+ for other interrelated power delivery controls.
- 477, Interrelated Power Delivery Controls, Including Engine Control, for interrelated controls including a control for an engine.

**745 In series plural interchangeably locked non-planetary units:**

This subclass is indented under subclass 640. Gearing comprising a plurality of interchangeably locked nonplanetary gearing units arranged in series.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 625+, 650 and 665+, for other plural gearing units.

## SEE OR SEARCH CLASS:

- 475, Planetary Gear Transmission Systems or Components, subclasses 207+ for nonplanetary transmission combined with a planetary transmission.

**810.1 Reversal of direction of power flow changes power transmission to alternate path:**

This subclass is indented under subclass 640. Subject matter having two alternately usable parallel power transmitting paths between a single input and a single output so arranged that (1) the interchange of the input and output relationship or (2) the change of direction of rotation of the input, changes the path through which the power is transmitted.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 6, and see the notes thereto for mechanical movements or gearing for initiating the starting of a machine.
- 352+, for change speed gearing including gears movable laterally with respect to the longitudinal axis of the transmission into mesh with a cooperating gear.

## SEE OR SEARCH CLASS:

- 475, Planetary Gear Transmission Systems or Components, subclasses 12+ for planetary gearing utilized to perform this function.

**810.2 Input and output exchange functions:**

This subclass is indented under subclass 810.1. Subject matter wherein in response to the interchange of roles between the transmission input member and the transmission output member the path through which power is transmitted is changed.

- (1) Note. To be placed herein the transmission must have a useful load at each of its input and output ends. Most of the patents herein disclose either motor-generators or motor-pumps used to start an engine which in turn drives the generator or pump.

## SEE OR SEARCH CLASS:

- 290, Prime-Mover Dynamo Plants, subclass 38 for gearing of this type combined with significant generator structure.
- 475, Planetary Gear Transmission Systems or Components, subclass 13 for this combination utilizing planetary gearing.

**813 ROTARY MEMBER OR SHAFT INDEXING, E.G., TOOL OR WORK TURRET:**

This subclass is indented under the class definition. Assemblies having (1) means for applying torque to a shaft or other rotatably mounted device to turn the shaft or other device about its axis to one or more selected loci, and (2) means to prevent or hold against rotation in at least one direction at such loci.

- (1) Note. EXPLANATORY NOTE: This and indented subclasses represents an initial step toward gathering together the "indexing" or "turret" art hitherto distributed on the basis of the disclosed associated operations. Pertinent subclasses from Classes 29 and 90 have been screened to provide the necessary art for initial classification. Integration with the preceding subclasses (10+) of this class (74), now limited to electronic



tuning shafts, is contemplated in the future. Similarly, as other appropriate bodies of art are screened, such art as meets the above definition will be classified here and so noted below as well as in the Notes to said bodies of art.

- (2) Note. The Notes under subclass 10 of this class (74) must be studied for both the line with other classes and for fields of search inasmuch as they apply with equal force to this and indented subclasses.

- (2) Note. Where, in addition to means for applying torque and means for preventing rotation, the turret structure to hold either work or tool is recited in the claims the art is deemed to go beyond the scope of this and indented subclasses (813+).

- (4) Note. The term “turret”, per se, is considered equivalent to “rotatably mounted device”. Included in this and indented subclasses (813+) are assemblies wherein a rotatably mounted device or “turret” is recited as a named load on a shaft. The inclusion of tool or work holding means on said load is sufficient to bar classification here (813+) and such combinations are classified on the basis of associated operations. For example; “a tool holding turret” is properly classified here, while “a turret with tool holding means” or “a turret with screw means to hold a work piece is not.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 10+, for assemblies particularly adapted for mechanically rotating one or more shafts of electronic tuning devices into desired angular positions.

SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 35.5+, inclusive, for turrets including means to hold either the work or tool, and see (3) Note above.
- 33, Geometrical Instruments, subclass 19 for means for scribing scale divisions on dials and the like, and subclasses 568+ for gages used to

establish desired angular position. Devices including mere indicia means rather than means to prevent or hold against rotation are classified in Class 33 as are indicia devices which do not include means for applying torque.

- 40, Card, Picture, or Sign Exhibiting, subclass 112, and various subclasses under subclass 446 for clutch take-up devices.

- 100, Presses, subclass 223 for reciprocating presses including rotary indexing material supports and see the search notes thereunder.

- 188, Brakes, subclass 68 for combined friction and positive locks, subclass 69 for positive locks, per se, and subclasses 70-79.5 for friction locks.

- 279, Chucks or Sockets, subclass 5 for angularly adjustable or indexing devices of the chuck or socket type.

- 408, Cutting by Use of Rotating Axially Moving Tool, subclass 35, for a multiple drill spindle turret, and subclasses 71 and 89+, for indexing work positioners used in conjunction with drilling and boring machines.

- 409, Gear Cutting, Milling, or Planing, subclasses 221+ for a position index device including means to hold the work or tool, and see (3) Note above.

- 451, Abrading, especially subclasses 149, 247+, and 292 for a turret-type work positioner.

#### **814 With safety device or drive disconnect:**

This subclass is indented under subclass 813. Devices including mechanism which prevents the assembly from improper functioning and/or responds to some imperfection, deficiency or fault in the functioning of the assembly to prevent further functioning.

#### **815 With locating point adjusting:**

This subclass is indented under subclass 813. Devices having one member on one part and another member on the other part which, by contact together, constitute a means for determining the angular position of the shaft, and in which at least one member is provided with means to change its position on the part and/or its point of contact with the other member.

**816 Preselected indexed position:**

This subclass is indented under subclass 813. Devices having means to interrupt and stop rotation of the shaft at a physically predestined position.

- (1) Note. The interruption of rotation responsive to a determination on the part of a human operator is not considered to be physically predestined.

**817 Sequential:**

This subclass is indented under subclass 816. Devices having a single initiator or source of power for rotating the shaft or load and having means to halt the shaft or load at each of a series of successive, predetermined positions.

**818 Skip position:**

This subclass is indented under subclass 817. Devices having means to cause the load or shaft to pass one or more preselected positions without stopping thereat.

**819 Held by torque:**

This subclass is indented under subclass 817. Devices having means to generate a rotating force to provide the angular repositioning of the shaft or load and using all or part of that force to hold the body against a position stop.

- (1) Note. This is usually accomplished by means of allowing the motor to stall without deenergization.

SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, subclass 436 for nonrunning energized electric motors.

**820 Geneva or mutilated gear drive:**

This subclass is indented under subclass 817. Devices having either a mutilated or a Geneva type gearing as defined in this class, subclasses 435 and 436, respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

435, and 436, for mutilated and Geneva gearing, respectively.

**821 Velocity control:**

This subclass is indented under subclass 817. Devices having additional means to vary the speed of rotation of the shaft or load as a predetermined position is approached.

- (1) Note. The speed is usually decelerated as it approaches the position.

**822 Interlocked rotator and brake:**

This subclass is indented under subclass 817. Devices wherein a common initiator or common source of power both turns the shaft or load and either permits rotation or prevents further rotation - the operation of turning is a condition precedent or subsequent to the operation of permitting or preventing rotation.

**823 Diverse-type brakes:**

This subclass is indented under subclass 822. Devices wherein the means permitting or preventing rotation comprises at least two distinct types of holding means, e.g., friction brake and positive brake.

**824 With axially acting friction brake:**

This subclass is indented under subclass 823. Devices wherein the operation of one of the holding means is effected by relative movement between radial face brake surfaces along the axis of the shaft or load.

**825 Plural operators or input drives:**

This subclass is indented under subclass 813. Devices having at least two means for applying torque to the shaft or rotatably mounted device.

**826 With means to axially shift shaft:**

This subclass is indented under subclass 813. Devices wherein the means to prevent or hold against shaft or load rotation includes a means to effect relative movement between radial surfaces along the axis of the shaft or load.

**827 Single revolution input effects desired fractional output:**

This subclass is indented under subclass 813. Devices wherein a rotary input, in multiples of 360° rotation, provides a turning of the shaft or rotatably mounted device, one increment of predestined angular rotation per multiple.

**828 ALTERNATING-MOTION DRIVEN DEVICE WITH MEANS DURING OPERATION TO ADJUST STROKE:**

This subclass is indented under the class definition. Mechanism comprising a reciprocating or oscillating-motion driven device provided with means to adjust the length and/or position of the stroke of the driven device while the mechanism continues in operation.

- (1) Note. This and the indented subclasses were established (1963) on the basis of patents originating in the art of expansible chamber motors. Similar organizations of mechanical movements or gearing may be found in this class in subclasses below providing for some aspect of the total organization provided for in this group of subclasses. No attempt has been made to screen the subclasses below to remove such art.
- (2) Note. This and indented subclasses may include either gearing or mechanical movement mechanisms or combination gearing and mechanical movement mechanisms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

20+, for parts having a mechanical movement but including a total organization as provided for in this group of subclasses, see (1) Note.

SEE OR SEARCH CLASS:

475, Planetary Gear Transmission Systems or Components, subclasses 14+, for planetary gearing used to provide a cyclical or intermittent drive.

**829 Constant length stroke with means to displace end limits:**

This subclass is indented under subclass 828. Mechanisms wherein the driven device has a stroke of nonvariable length with means for changing the position of the stroke relative to a stationary part of the mechanism.

**830 Cyclical displacement responsive to the alternating-motion:**

This subclass is indented under subclass 829. Mechanisms wherein changing of the position of the stroke is caused mechanically by the alternating-motion imparted to the driven device.

**831 Stroke adjustable to zero and/or reversible in phasing:**

This subclass is indented under subclass 828. Mechanisms wherein the stroke can be diminished to the point of no motion and/or be caused to act in a direction cyclically opposite to that in which it has been operating.

**832 Plural driving means to jointly drive the driven device:**

This subclass is indented under subclass 831. Mechanisms having two or more driving motions for simultaneously or commonly driving the alternating motion driven device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

665+, for plural driving means without adjusting means and see (1) Note to subclass 828.

**833 Device driven from selected points on oscillating link:**

This subclass is indented under subclass 831. Mechanisms having an oscillating link driving the alternating-motion driven device from chosen positions along the link.

**834 Driving lever with adjustable pivot point:**

This subclass is indented under subclass 831. Mechanisms wherein the means to diminish or reverse the stroke includes a lever having a driving input connection, a driven output connection, and a pivot connection for the lever which is adjustable along the lever to vary the movement arm thereof.

**835 Eccentric and strap drive, shiftable eccentric:**

This subclass is indented under subclass 831. Mechanisms wherein the means to diminish or reverse the stroke includes an eccentric and strap drive with the position of the eccentric being adjustable relative to a stationary part of the machine.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
571.1, for features of the adjustable eccentric and strap, per se, and see (1) Note to subclass 828.
- 836 Changing the extent of eccentricity:**  
This subclass is indented under subclass 835. Mechanisms having means to vary the amount of eccentricity.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
571.1, for features of the adjustable eccentric and strap, per se, and see (1) Note to subclass 828.
- 837 Crank pin drive, shiftable pin:**  
This subclass is indented under subclass 831. Mechanisms having an off-center pin drive with the position of the pin being adjustable to diminish or reverse the stroke.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
600+, for features of adjustable cranks and wrist pins, per se, and see (1) Note to subclass 828.
- 838 Cam and follower drive:**  
This subclass is indented under subclass 831. Mechanisms having a cam-driven follower causing movement of the driven device.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
568, for adjustable cams, per se, and see (1) Note to subclass 828.
- 839 Axial-type cam (e.g., wabblers type):**  
This subclass is indented under subclass 838. Mechanisms having a rotating or oscillating cam which causes movement of its follower substantially parallel to the cam axis.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
568, for adjustable cams, per se, and see (1) Note to subclass 828.
- 840 ROTARY DRIVEN DEVICE ADJUSTABLE DURING OPERATION RELATIVE TO ITS SUPPORTING STRUCTURE:**  
This subclass is indented under the class definition. Mechanisms comprising means to drive a load device in a circular or orbital path about a fixed axis lying either within or outside the confines of the device and having means operable while the mechanism is in motion to change the location of the device relative to supporting structure which does not partake of all motions of the device.
- (1) Note. This and the indented subclasses were established (1963) on the basis of patents originating in the arts of expansible chamber motors and boring or penetrating the earth. Similar organizations of mechanical movements or gearing may be found in this class in subclasses below providing for some aspect of the total organization provided for in this group of subclasses. No attempt has been made to screen the subclasses below to remove such art.
- (2) Note. This and indented subclasses may include either gearing or mechanical movement mechanisms or combination gearing and mechanical movement mechanisms.
- 841 Screw and nut adjusting means:**  
This subclass is indented under subclass 840. Mechanisms wherein the location changing means include a screw and nut mechanism.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
424.71 through 424.96, for screw and nut mechanisms, per se, and see (1) Note to subclass 840.
- 842 Rack and pinion adjusting means:**  
This subclass is indented under subclass 840. Mechanisms wherein the location changing means includes a rack and pinion mechanism.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
422, for rack and pinion mechanisms, per se, and see (1) Note to subclass 840.

## CROSS-REFERENCE ART COLLECTIONS

**900 PARTICULAR SHIFT PATTERN:**

Collection of art disclosing a transmission control element or mechanism manipulated through a specific pattern or path.

## FOREIGN ART COLLECTIONS

The definitions for FOR 100-FOR 104 below correspond to the definitions of the abolished subclasses under Class 74 from which these collections were formed. See the Foreign Art Collections schedule for specific correspondences. [Note: The titles and definitions for indented art collections include all the details of the one (s) that are hierarchically superior.

**FOR 100 TRANSMISSION CONTROL:**

Foreign Art Collections for systems for manually controlling transmissions.

**FOR 101 Foot operated:**

Foreign Art Collections for systems for manually controlling transmissions in which the control member is foot operated.

**FOR 102 With detent mechanism:**

Foreign Art Collections for systems in which there are stop or checking devices used in conjunction with a member of the transmission control system to hold that member in a predetermined position until moved therefrom by an application of force transmitted to the member from the control system.

**FOR 103 With reverse lockout:**

Foreign Art Collections for systems in which there are stops which prevent accidental or unintentional shifting into reverse.

**FOR 104 With interlocked elements:**

Foreign Art Collections for systems in which there are devices which are operated by elements of the system for preventing simultaneous movement of the shift rods.

END